

display CP

# THE RAILWAY GAZETTE

Price: Two Shillings

FRIDAY, MAY 1, 1959

UNIVERSITY  
OF MICHIGAN

Annually £5 by post

MAY 18 1959

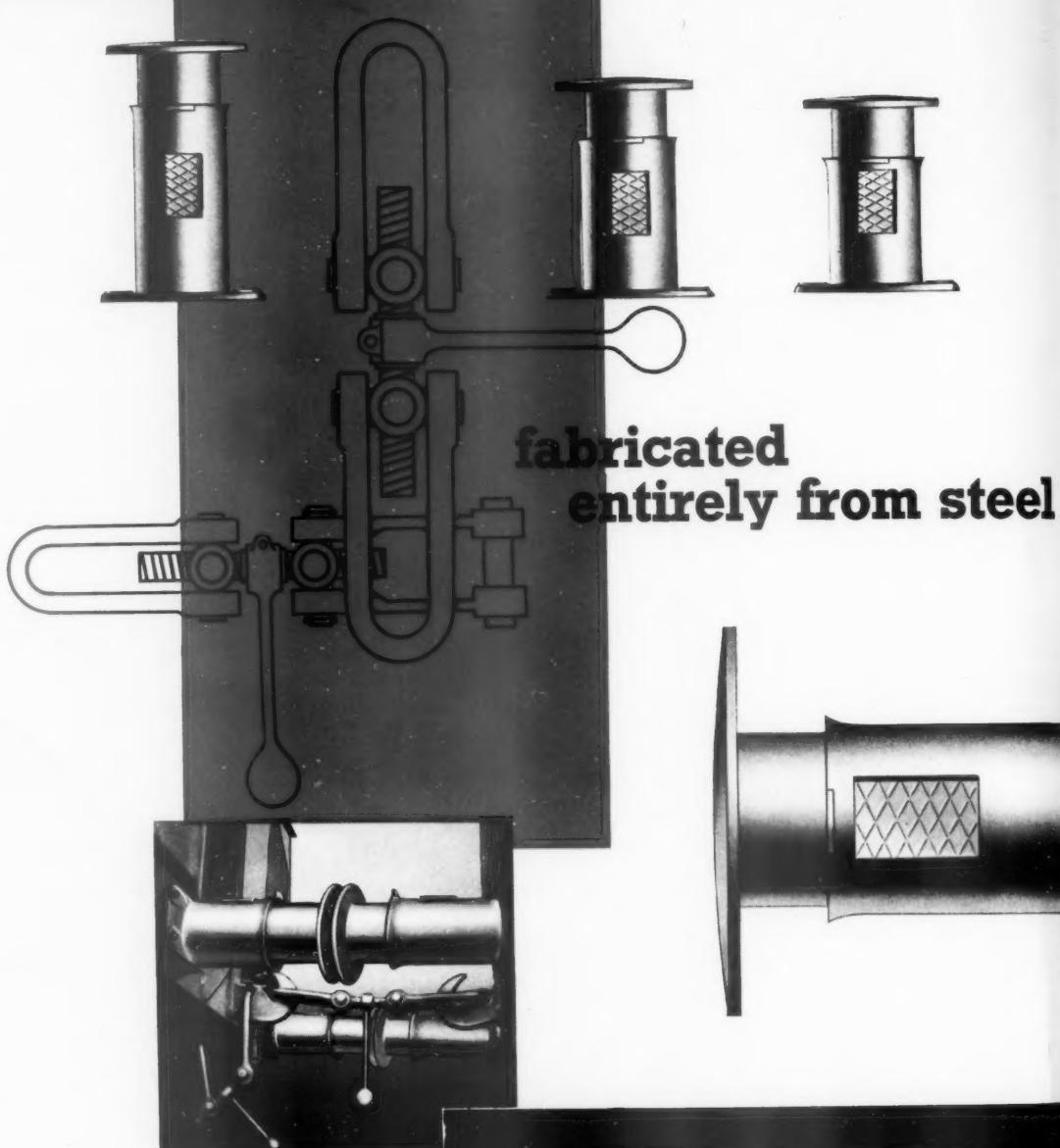
TRANSPORTATION  
LIBRARY

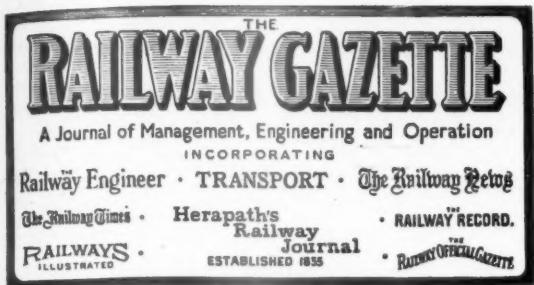


Reproduced by courtesy of British Railways

ELASTIC RAIL SPIKE CO. LTD.

41-43, MINCING LANE, LONDON, E.C.3

**FORGED****for greater strength****GARRINGTONS  
SPENCER - MOULTON  
GARRINGTONS****GARRINGTONS LTD., NEWTON WORKS, BROMSGROVE, WORCS.**



33, TOTHELL STREET, WESTMINSTER, LONDON, S.W.1  
Telephone: WHitehall 9233 (20 lines) Telegrams: "Trazette Parl London"

BRANCH OFFICES

GLASGOW: 139, Bothwell Street, C.2 . . . . . Central 4646  
NEWCASTLE-ON-TYNE: 21, Mosley Street . . . . . Newcastle-on-Tyne 22239  
MANCHESTER: Century Insurance Building, St. Peter's Square. Central 7667-8-9  
BIRMINGHAM: 90, Hagley Road, Edgbaston . . . . . Edgbaston 2466  
LEEDS: 70, Albion Street . . . . . Leeds 27174  
BRISTOL: 20, Victoria Square, Clifton . . . . . Bristol 33873  
Annually £5 by post. Single copies, Two shillings.

Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Editor: B. W. C. Cooke, Assoc. Inst. T.

Vol. 110]

FRIDAY, MAY 1, 1959

[No. 18

CONTENTS

	PAGE
Editorial Notes . . . . .	497
Passport Profiteering . . . . .	499
London Transport Problems . . . . .	499
Brunel's Last Railway Masterpiece . . . . .	500
New Series of Steel Rails . . . . .	501
Indian Railway Testing and Research, 1957-58 . . . . .	501
Better U.S.A. Results . . . . .	502
Letters to the Editor . . . . .	502
The Scrap Heap . . . . .	503
Overseas Railway Affairs . . . . .	504
Modified Blanketing . . . . .	506
Type "4" Diesel-Electric Locomotives for British Railways . . . . .	509
Personal . . . . .	513
New Equipment and Processes . . . . .	516
News Articles . . . . .	519
Contracts and Tenders . . . . .	521
Notes and News . . . . .	522
Railway Stock Market and Official Notices . . . . .	524

New Chairman of L.T.E.

THE Chairman designate of London Transport Executive, Mr. A. B. B. Valentine, who, as recorded in our personal pages, succeeds Sir John Elliot on the latter's retirement on June 30, has had experience of exceptional value for the position he assumes. His career in London Transport and its predecessors, dating back to 1928, when he joined the Underground group of companies, includes some years as senior Personal Assistant to Frank Pick, the dynamic creator of much of London Transport as it is today, but he has emphasised that time has shown some of Pick's ideas and hopes, and those of his chief and collaborator, Lord Ashfield, to need amendment in the light of changed circumstances. In his London Transport service Mr. Valentine gained experience of fares work—he has been an eloquent and most carefully briefed witness for L.T.E. before the Transport Tribunal—operating, publicity, and supplies. His knowledge of the wider fields of transport has been enhanced by his full-time membership since 1954 of the British Transport Commission and membership of the Southern Area Board of the B.T.C. Mr. Valentine is modest and very industrious, and dedicated, now that he has returned to the scene of his earlier service at 55, Broadway, S.W.1, to

the well-nigh impossible problem of reconciling the demands of the public for transport both cheap in price and good in quality, and to enabling L.T.E. to close the gap estimated at £1,000,000 for the current year, between expenditure and the receipts sufficient for it to make its due contribution to the Commission's central charges. He is anxious to improve the condition of L.T.E. staff as far as circumstances allow. In retaining his seat on the Commission whilst presiding over London Transport Executive, Mr. Valentine to some extent will be in the position of the Area Board Chairmen, who are members of the B.T.C., though the Regions of British Railways with which they are concerned have their General Managers. To relieve Mr. Valentine of some of the load borne by former Chairmen of L.T.E., Mr. A. H. Grainger, Deputy Chairman—who for some years assisted Lord Ashfield in matters of administration—is also appointed Managing Director, responsible to Mr. Valentine for day-to-day management and co-ordination of all executive work. The designation of the post is a revival of a title of Frank Pick, who, however, was appointed Managing Director of the companies included in the Underground group. Mr. Grainger's membership of the Executive is associated with responsibility *inter alia* for railway, civil, and electrical engineering, but the precise scope of his duties is being reviewed. He has given distinguished service to London Transport over many years and is exceptionally fitted for the heavier responsibilities he will now carry. Sir John Elliot's comments on the appointment are given elsewhere in this issue.

Decline in Engineering Orders

REDUCTIONS in orders for the British heavy engineering industry during the first quarter of the current year of up to 15 per cent in the export, and of five to 15 per cent in the home, market are assessed by the Economic Survey Committee of the Purchasing Officers Association. In electrical engineering orders have varied from 10 per cent up to 20 per cent down; in the electronics section export orders have been maintained while home orders have increased. In light engineering, reductions of as much as 20 per cent are reported, though there has been considerable variation in the industry. For both rubber and plastic products the export demands are stated to be unchanged, with increased home demands. Amongst the relatively few materials stated to be in short supply are reported to be strip mill sheets and large porcelain insulators for high voltages. The range of firms in the industries concerned is too wide to enable conclusions to be drawn regarding industries supplying railways.

Diesel Traction in South Africa

ALTHOUGH the steam locomotive is not expected to disappear completely from South African Railways in the foreseeable future, its replacement by diesel, and, on certain heavily trafficked lines, electric, traction is proceeding steadily. The first 45 1,320-b.h.p. 70-ton Bo-Bo diesel-electric locomotives ordered from General Electric have been in service for some time and their performance is reported to be very good. They have been used for heavy coal haulage from the Witbank area and also on some main-line passenger trains. The next step will be the introduction of diesel power in South West Africa. For this purpose 115 diesel-electric locomotives of 1-Co-Co-1 axle notation and 1,980 b.h.p. sea-level output are on order from International General Electric, and it is hoped that their delivery will coincide with the completion of the broadening of the 2-ft. gauge lines in S.W. Africa, to the 3-ft. 6-in. gauge. As the diesel-electric locomotive does not have to be watered, and it would no longer be necessary to rail locomotive coal 2,000 miles, and diesel operation is expected to result in considerable economies.

Suburban Line for Karachi

THE railway so far has played comparatively little part in suburban transport in and around Karachi. The layout of the North Western Railway of Pakistan, of which the double-track main line from Lahore terminates, for ordinary passenger traffic purposes, at Karachi City Station, has not

been conducive to suburban traffic. The Minister for Communications, Mr. F. M. Khan, has announced that a £1,800,000 scheme to build a suburban railway to serve the city and environs, has been included in the second Five-Year Plan. Trains will be handled, it is stated, by diesel locomotives, as electrification cannot be justified economically, at least in the foreseeable future. Gas-turbine locomotives are reported to be under consideration. Diesel railcars no doubt will work some services. The new line presumably will form part of the N.W.R. 5-ft. 6-in. gauge system. It is not yet known how much construction, in flat country, is involved to serve a community with a population today of some 1,500,000.

### Another Transport Inquiry in Northern Ireland

THE facts as to transport in Northern Ireland are well known to everybody concerned, and it is hard to see what more could be learned from the fresh inquiry into public transport now proposed by the Belfast Chamber of Trade. The recent statutory obligation on the Ulster Transport Authority to pay its way within five years may result in a strong desire to close, as unremunerative, more of what is left of the railways of Northern Ireland. The Government of that province should consider carefully before depriving the community of goods and passenger transport which are essential to many individuals and business enterprises. To reduce further the attenuated railway system even in a country of short distances, is hardly compatible with the Government's plans for industrial development. Nor is it certain that the lines now open, despite the loss of some feeder branches, cannot be made to pay sufficiently to justify their continuance, taking into account their value to the community. The prosperity which has enabled many to buy and maintain private transport vehicles may not continue. In considering closure of one or other of the lines between Belfast and Londonderry, the economic value to a large area should be weighed of the former Great Northern Railway line from Portadown via Omagh and Strabane.

### Crewe Pupils' Annual Dinner

THE first Crewe Pupils & Apprentices Association dinner was held in 1889 or 1890 at Crewe. Since then, apart from wartime breaks and another between 1954 and 1958, it has been held annually, usually in London. The most notable event for Crewe men during the past year was the manufacture of the last steam locomotive at the works. This event was filmed by newsreel cameramen, and an extract from the film was presented to the association as a permanent record. At present there are over 1,000 apprentices at Crewe, and the membership of the association is steadily growing. Many eminent locomotive engineers have trained at Crewe, and a number of them have served the association as chairmen. Today facilities and amenities for trainees are better than ever, and full use is being made of the Apprentice School opened in 1953. Although the steam era at Crewe is closed, the opportunities offered by an apprenticeship are even greater than before, as technical knowledge becomes more specialised. Brief reference to this year's dinner, which took place in London last week, is made elsewhere in this issue.

### Track Renewal in Long Cutting and Tunnel

ON the Paris-Toulouse main line, on which there are many structures, the French National Railways recently were faced with the problem of replacing rails and sleepers on the 14-mile double-track section between Brive and Souillac. The long lengths of tunnel and narrow cutting, and extensive curvature did not allow establishment along the line of stocks of sleepers and rails. To overcome the difficulty an adapted Drouard track-laying machine, standing on the last complete section of old line, lifted on its overhanging jib, from a wagon in front of it also on the old track, a number of R.S. type concrete block and steel tiebar sleepers, and carried them along its jib to the other extremity, where they were lowered on to a section of track from which the old rails and sleepers had been removed. Seventy-two-metre (236-ft.) lengths of welded rail were then slid into place and fixed, after which the wagon from which the sleepers had been taken was itself lifted by the Drouard machine and transferred to the newly laid track. The Drouard then moved along and the sequence was con-

tinued. By this means some 1,600 ft. of track was renewed daily. The speed limit over this section has been raised from 53 to 59 m.p.h.

### Encouraging Mid-Week Travel

RE-INTRODUCTION, next Tuesday, of cheap mid-week tickets by British Railways is a reminder of the efforts made to gain additional passenger revenue and to minimise the difficulties and expense of operating trains and providing rolling stock when traffic is concentrated at weekends. Few people who complain of travelling conditions, including unpunctuality, on Saturdays in the high season, realise how comfortable and punctual travel usually is earlier in the same weeks. The mid-week tickets afford a saving of about 4s. in the £ on the second class fare. To what extent it will be possible to induce holidaymakers to travel in mid-week, is problematical. Many hotels and boarding houses insist on Saturday-to-Saturday bookings, and apart from this many people prefer to include weekends at the beginning and end of their fortnight's holiday, even at the expense of comfort in travel.

### Aluminium Service

ONE of the occasions when it is made quite clear by a commercial undertaking that it does not just wish merely to sell its products, but to provide adequate technical service, occurred last week. As this has always been one of the principles of the British Aluminium Co. Ltd., since it was formed in 1894, the Research & Development Staff decided that having virtually concluded a chapter on new equipment for welding of aluminium alloys in relatively thin panels and extruded section, the information and results should be made available to industry. Invitations were sent to British Railways and rolling stock contractors' engineers to review this company's Research Laboratories at Chalfont Park, their facilities and results of their endeavours. Amongst these were equipment for welding relatively thin sheet and extrusions by a new process, automatic continuous welding, automatic ultrasonic testing, dynamic strain gauging of structures such as bogies under service conditions, in addition to all the normal contemporary welding, mechanical and fatigue testing equipment. Some details of the visits and the equipment inspected are given elsewhere in this issue.

### Steam Locomotive Overhaul

ALTHOUGH practically no new steam locomotive construction is now being undertaken anywhere in the world, a recent estimate from France is that something like 150,000 still exist. They represent a capital investment which must yet be maintained and utilised, and they cannot all be swept away at a pace commensurate with diesel and electric locomotive production. Many of them will go through at least one more general overhaul, and some of them two. In many cases opportunities will then occur of introducing modifications, or even of rebuilding, at a not exorbitant cost to improve the service and thermal efficiencies over the remainder of the locomotive's life. Superheaters may be introduced where they were not present in the original design; oil-firing may replace coal-burning; feed-water heaters may be added; roller bearings can be applied to coupling and connecting rods; roller bearings and manganese-steel liners fitted to axleboxes; the wheel arrangement may be altered by the provision of carrying axles to give higher safe top speeds or to enable more fuel and water to be carried; or, as has been done in one or two examples, the steam locomotive may be converted to a high-pressure fireless locomotive of a modern type such as the Henschel-Gilli.

### Locomotive Fuel in Eastern Germany

THAT diesel traction has not progressed in the German Democratic Republic (Eastern Germany) to anything like the extent it has in the Federal Republic (Western Germany) has been due in part to the difficulty in importing fuel; for though large quantities of crude oil are produced in Iron Curtain-bloc countries the needs of the Reichsbahn have not been put high on the priority list. Even the proposed programme for diesel motive power has been cut back, by the

elimination of the 2,400-b.h.p. Co-Co design, and the largest class in the programme now is the 1,800-b.h.p. B-B diesel-hydraulic type. Recent studies have shown that the authorities consider the use of a home-produced fuel to be the most important consideration; and that as lignite is the principal home-produced fuel, a programme of electrification would be the most economical and would also improve efficiency of operation. Nevertheless, up to the limit of possible imports, diesel traction is to be introduced and railbuses very similar to the Uerdingen type in Western Germany are now being delivered. As to steam locomotives, it seems that a new case has been made out for pulverised lignite-coal firing.

### Derby-built Type "4" Diesel-Electric Locomotive

**F**ITTED with the Sulzer double-bank diesel engine rated at 2,300 h.p., the British Railways Type "4" locomotive described elsewhere in this issue is the highest-powered diesel locomotive to be constructed under the modernisation plan in British Railways workshops. The power equipment, previously used in some diesel units on Continental railways, incorporates a gear-driven generator. This affords the desirable combination of slow-speed engine and high-speed generator. The 1Co-Co1 axle arrangement has been considered necessary for keeping within the maximum axleload of 20 tons. The importance attached to a body structure of considerable stiffness is apparent. Like other recent British Railways diesel locomotives, the body frame lattice girder members form a deep truss. The inherent stiffness of this construction is enhanced by the continuous sheet steel corner panel extending, for the full length, from the contrail to the power unit roof hatch. Disposable weight is well distributed by placing the main fuel and water tanks over the outer end of the bogies. In dividing the complete locomotive into suitable sub-assemblies for building and servicing, consideration has been given to obtaining a fair departmental spread of work over the Derby workshops affected by the changeover from steam to diesel construction.

### Passport Profiteering

**B**Y doubling the cost of renewing a passport attention has been drawn to the considerable profit made by the Government on the fees charged for issuing and renewing passports. By demanding roughly twice the administrative costs involved a tax is in effect imposed on travel which it is difficult to defend. In fact, it is hard to fathom the reason for this profiteering on the issue of travel documents which the Parliamentary Under-Secretary in reply to last week's adjournment debate declared were not required by the British Government but by foreign governments. This most surprising statement is hard to reconcile with the passport formalities which every British subject must undergo on leaving and entering the country, and with the refusal of the Government to follow the recommendation of the Council of Europe and dispense with passports for inter-European travel. In seven European countries identity cards, issued free or for a small charge only, are all that is required for travel between those countries. Tourists to Britain from them are, however, still required to present their passports on arrival.

Since the war, thanks to the greater ease and speed of travel and to the higher standards of living generally enjoyed, travelling abroad has greatly increased. On all sides this is recognised as an aid to better understanding and is generally encouraged, at least this side of the Iron Curtain. Yet the cost of a passport and its renewal is double the pre-war charge. The result is that although administrative costs have risen the greater number of documents issued has led to spreading of overhead costs which enables the Government to reap the substantial profit of some £626,000 from the £1,150,000 it collects in fees. On this basis the passport fee could be reduced to the pre-war price of 15s. and still leave the Government with money in hand. It would then be carrying out the recommendation of the O.E.E.C. which in its report on tourism in Europe stated there should be a "reduction on price of passports to the limit strictly necessary for covering the costs of issue and delivery." Apparently the Government cannot see its way to carry out the recommendation of the report to which it was a party.

The Foreign Office defence of what cannot but be considered an exorbitant fee is unconvincing. At first it justified itself

on two grounds: that administrative costs had risen and the revenue was needed. It still stands by the former but the Parliamentary Under-Secretary apologised for deploying the latter argument when he replied to the debate initiated in protest at the doubling of the renewal charge by Mr. Ernest Davies on Friday. He withdrew it in favour of the claim that it was reasonable that passport holders should contribute to the cost of our embassies and consulates which provided services for British subjects living or travelling abroad. He went so far as to contend that the issuing and renewal of passports by them resulted in a loss and should be met out of the fees in dispute. It is as difficult to accept this as a justification of making a profit of 120 per cent. on the issue of passports as it is the other argument first advanced. Our overseas missions must be maintained in any event and it is questionable whether a single additional official has to be employed by them to provide this service. More likely it is that it is fitted into their other functions. It does not seem reasonable to charge more than necessary to British citizens domiciled at home to subsidise those resident overseas.

Mr. Ernest Bevin once stated that the aim of his foreign policy was "to go down to Victoria Station, get a railway ticket and go where the hell I liked without a passport or anything else." That commendable wish is as far from realisation as it was when he expressed it in 1946. It is unfortunate, because although the continuation of passport formalities, and the unnecessarily high cost of the documents, may not deter travel to any great extent, it causes annoyance and inconvenience and slows down journey times, especially at the ports during the peak of the tourist season. Tourism is today one of Britain's greatest industries and its best dollar earner. Equally, among the Europeans the British are the greatest travellers. It seems only right that, more than any country, far from discouraging travel through the imposition of unnecessarily high charges it should encourage it by reducing the formalities to a minimum and facilitating the exchange of visits to the greatest extent possible. It is to be hoped that the airing of this latest impost in Parliament will have brought home to the Government the strength of public opinion and that the Foreign Office will now reconsider its refusal not only to review its charges but to follow the example those bolder European countries which are experimenting with the abolition of passports to assist in the greater freedom of travel.

### London Transport Problems

**T**HE steps already taken and being taken by London Transport to improve its services, and to foresee the demands of the travelling public are among the many facts presented by Sir John Elliot, Chairman of London Transport Executive, in his paper given last week to the London County Council College of Distributive Trades. The scope of the effort to improve the London Underground is shown in the expenditure of over £30,000,000 during the next four years on the most comprehensive modernisation scheme for the Underground since the war. The programme, Sir John Elliot points out, is the measure of the determination of L.T.E. to keep the system up-to-date and efficient. It includes renewal of over one-third of the Underground trains to the number of 200. All will be in the new silver livery, which in its brightness and cleanliness makes an excellent impression on the passenger.

Among main items of expenditure are £10,000,000 for 76 new trains to re-equip the Piccadilly Line completely and give one-seventh more passenger-carrying capacity. Delivery of trains is starting this year. £9,000,000 is to be spent on 31 new trains for the Amersham-Chesham-Watford services of the Metropolitan Line, with delivery starting next year, electrification of the 10-mile Rickmansworth-Amersham-Chesham section, and doubling of the overloaded seven-mile Harrow-Moor Park section. The programme, to be completed in three years, will increase the carrying capacity of the combined London Transport and British Railways services to stations north of Harrow by over one-quarter, and will give improved regularity and speed of journeys. For the Central Line, 87 trains, made up of new and rehabilitated cars in equal numbers will absorb £9,000,000. Test trains will be running early next year and the main delivery will start in 1962. The new trains combined with the lengthening of all trains to eight-cars early next year, will give the line nearly 25 per cent addi-

tional passenger capacity. The main improvement on the District Line is the work on the 12-mile Bow-Upminster section, costing £2,500,000, besides the British Railways modernisation scheme of flyovers at Barking which will eliminate track crossings on the level. Expenditure of £300,000 on new vehicles to lengthen all Circle Line trains from five to six cars. In addition, the Underground current distribution system is being modernised at a cost of over £2,000,000.

Like the replacement of the trolleybus fleet, costing £10,000,000, this plan for the Underground is part of the design for the future. Sir John Elliot is confident that when the Victoria Line, the new and badly needed tube across the heart of the West End and out to the north-east, is built as well, "London will have a public transport system worthy of it." Both the retail trade and London Transport, he emphasises, must be highly adaptable to changes in social habits. With many more married women at work, shopping habits have changed. Much shopping is now done by the married woman in her lunch hour near her place of work, with the week-end shopping often completed on a Friday evening in a self-service supermarket. This has obvious repercussions for both retailers and transport operators. The changing face of London also affects them. While London was growing slowly, the distribution of the population had changed greatly and was continuing to change. The tendency was still for people to move outwards. The days have gone, Sir John Elliot states, when tube extensions could be built into virgin country, as the Underground constructed extensions to Edgware and Cockfosters, with the certainty that the homes and the people would follow. The way in which London can grow and be redeveloped is now prescribed by the town-planners. This dispersal and continual movement of the population mean that London Transport services must be constantly adapted. There has also been the tendency for many years for retail trade in the suburbs to grow more rapidly than in the West End. This does not mean that the centre is losing its pull. Office employment is bound to grow in the West End and City, as new office buildings show, and where masses of people are brought together to work, there must be shops to serve them.

The social changeover to the five-day week and earlier shop closing have led to a concentration of travel to and from work. Before the war the homeward rush was spread over two or three hours. "Today it is all over in one mad scramble in little more than one hour. Staggering of working hours, even by a small adjustment of 15 min. would afford a notable improvement. The retail trade, Sir John Elliot observes, could make a big contribution to staggered hours and would benefit from it. Central London departmental stores by internal staggering could, he suggests, keep open half an hour longer a day, which would lead to more trade and would spread the load on public transport services, making travel easier for shoppers and staffs alike. A solution must be found or the position will become intolerable, as it has become in some cities in the U.S.A. where there is a very real fear, and much evidence, that almost complete clogging of streets in the down-town areas of cities will lead to the decay or "blight" of city centres; certain departmental stores, despairing of obtaining their fair share of trade in the traditional shopping centres, have built entirely new shops out in the open country with large car parks.

The evolution of the urban community of today, he maintains, would not have been possible without modern transport. "It is in no one's interest to allow personal transport to paralyse our urban amenities. This will surely happen unless adequate steps are taken in the greater interests of us all." Most of the motorcars which "crawl into London in the morning" carry only the driver. A bus is 15 times more efficient in road space occupied per passenger in peak hours. When rising living standards exceed a certain point, he points out, further increase is likely to be channelled largely into expenditure on personal transport. That had been the experience in the U.S.A., and it is happening in Britain now. If London is to survive and thrive, Sir John Elliot stresses, public transport of all kinds must be allowed to play its proper part, and the private car, used by a minority, must not be allowed to strangle the life-lines of a great city. In this London Transport and the retail trade have a close community of interest. If they fail the entire urban community structure must change, forcing retail distribution into a new, and perhaps less comfortable, mould. "So let us assess the major problems aright,"

he concludes, "and take positive action while there is still a little time left. Londoners have always been renowned for common sense. Now is the time to show it, and to use it. If not, we are all in for a rough time, and serve us right. Today in London we are practically down to horse-bus times."

### Brunel's Last Railway Masterpiece

AS a centenary tribute to the work of one of the greatest of the pioneer British engineers, the Western Region of British Railways is co-operating today (May 1) with the civic authorities on both sides of the River Tamar to mark the anniversary of the formal opening on May 2, 1859, by the Prince Consort of the Royal Albert Bridge at Saltash. The designer of this great and justly famous structure—Isambard Kingdom Brunel—was born on April 9, 1806, the only son of Marc Isambard Brunel, himself an outstanding engineer who was knighted by Queen Victoria in 1841 for his many public works. The son began practical engineering in 1826, under his father, at the Thames Tunnel (now used by the East London Railway). At the age of 21 he confided to his diary his desire "to distinguish himself in the eyes of the public," an ambition that undoubtedly he achieved. He also thus early revealed an egotism which played its part in influencing the way in which he exercised both his genius and also his enormous capacity for concentrated work. This may explain in part the remarkable circumstances that so outstanding and individualistic an engineer did not form the subject of a full independent biography for 87 years. A sound factual "Life" was published in 1870 by his son, and some valuable further light was shed in the tribute "The Brunels: Father and Son," by I. K.'s granddaughter, Lady Noble, in 1938, but it was not until 1957 that L. T. C. Rolt's biography appeared. That author disclaimed any hero worship in his enquiries, although he clearly revealed an understandable admiration for his subject. One reason which he suggested for the long delay in the appearance of an independent biography was that, as I. K. was not a self-made man rising from very humble beginnings, he did not qualify for the attention of the Samuel Smiles school of biographical moralising.

Brunel became engineer to the proposed Great Western Railway in 1833, and rapidly assumed a dominating position in the execution of the great work. Rolt said that "Brunel regarded himself as Commander-in-Chief of the engineering staff of the Great Western Railway and would brook no interference with them from any man, Directors included." His activities during the next quarter of a century earned him his place in what was called the great triumvirate of engineers, sharing this honour with Robert Stephenson and Joseph Locke. At the beginning of 1859, all were with us, and all aged in the fifties. By the end of the year two were dead, and the third had only a few more months to live. What has been termed the "heroic age of engineering" was over. It is generally recognised that the ill-fated steamship *Great Eastern* was the venture which was directly responsible for Brunel's financial ruin, and death from paralysis at the early age of 53 on September 15, 1859. Robert Stephenson, who had attended Brunel's funeral in Kensal Green Cemetery, himself died on October 12, within a few days of his fifty-sixth birthday.

Brunel's final railway masterpiece was the great bridge over the River Tamar at Saltash, which provided the last link in the railway between Paddington and Penzance. Here the river is 1,100 ft. wide and 70 ft. deep in the middle at high water. The Admiralty required a headway of 100 ft., and Brunel prepared various plans (a timber structure; a four-span design; and a single 1,000-ft. span) before finally determining upon the single-track bridge which we know, with its central river pier and two main spans of 455 ft. each. The railway is 110 ft. above high water level. The whole length of the structure is about 2,190 ft., as in addition to the two great spans, there are 17 side spans, varying from 70 ft. to 90 ft.; the total cost was £225,000.

An article on the difficulties that were overcome during the construction of the bridge is contributed by Rolt to the May issue of our associated publication, *The Railway Magazine*. This impressive landmark today carries loads never contemplated when it was built, and that without structural alteration to the main spans beyond strengthening the floor members by the addition of 401 new cross girders in 1905. H.R.H. the Prince Consort, as Lord Warden of the Stannaries, per-

mitted the bridge to be called the Royal Albert Bridge, and consented to open it in person. This he did on Monday, May 2, 1859, during a strenuous programme which involved his leaving Windsor Station at 6 a.m., and arriving back at 12.50 the following morning. The 53½ miles of the Cornwall Railway from Plymouth to Truro were inaugurated formally by the Directors on the next day, and the whole enterprise was opened to public traffic on May 4. Brunel was too ill to attend the opening ceremony, and, in fact, was abroad at the time for the sake of his health. Towards the end of May he saw his completed work for the first and last time, reclining on a couch placed on a trolley, which was drawn slowly across the bridge. After his death the directors of the Cornwall Railway erected in large raised letters over the land archways the simple inscription "I. K. Brunel, Engineer, 1859."

### New Series of Steel Rails

THE British Standards Institution, in publishing a revised edition of its Standard 11 for flat-bottom railway rails, is not only keeping abreast of railway development, metallurgical knowledge and engineering technique, but is setting a lead in modern rail section design. That the design is well proportioned is borne out by the fact that the International Union of Railways selected the same section, with minor adjustments to meet certain continental requirements, for the U.I.C. 54 kg./m. rail. Since the first British Standard Specification for flat-bottom rails was published, in 1905, there have been several revisions as the result of the continuous attention of the appropriate technical committee. In the meantime, too, methods of mounting rails on sleepers have changed, and considerable research has taken place into the distribution of stresses within the rail.

The new series of rail sections comes into being with the issue of revised editions of British Standard 11, "Flat-bottom railway rails" and its related British Standard 47, "Steel fishplates for railway rails." The rails are those in the range of 65 lb. per yd. up to and including 110 lb. per yd., and will be referred to as the "A" series. The standard no longer specifies sections for rails in the 115-120 lb. per yd. range. Sections remain unaltered for rails in the 25-60 lb. per yd. range. The "A" series represents the latest design practice, based on practical track experience, prolonged and detailed studies of British Railways Research Department, and the experience of the British steel industry.

In revising the sections, the British Standards Institution called on the practical experience and researches of railways using the old sections. The following conclusions were reached: very high stresses can arise in the fillets joining the web of the head and foot of the rail; high stresses can be induced in the vicinity of bolt holes under the wedging action of flat fishing angles; unequal top and bottom fishing angles lead to differential wear, resulting in tilting of the fishplates and deterioration of the joint; a better disposition of available metal can be obtained by reducing the foot width, without affecting stability or giving an inadequate bearing area.

The British Railways 109 lb. per yd. rail has been designed as a result of similar studies and satisfactory performance in 7,000 miles of track. The Institution adopted this section as the basis of its design for the whole of the "A" series of standards. The "A" series has larger fillet radii, joining web to head, being a compound radius. The use of equal top and bottom fishing angles has resulted in the reversion to the double angle foot, to obviate an unbalanced section, with excess metal in the foot. Foot widths have also been reduced, to allow better disposition of metal within the section. The sides of the head have been tapered at 1 in 20, which, not only gives additional metal to resist side wear, but also increases the width of the top fishing table. The old series had a head radius of 9 in., corresponding to the radius to which rails normally wear in service.

The increasing trend towards heavily-loaded wheels of small diameter, induces high stresses when tyres are new, and makes a larger radius desirable at the point of contact. These two conflicting requirements have been met by the introduction of a compound radius in the larger sections, 12 in. over the central portion of the head, followed by a sharper radius to give an overall average approximating to 9 in. This offers the added advantage of reducing the tendency towards corner shelling. For sections below category 95A, this compound

radius is of less practical significance and a simple 12 in. radius is used. In comparing old and new sections, it will be found that in some cases the moment of inertia is slightly reduced. Experience has indicated that efficient disposal of available metal, to avoid high stress concentrations, is of far greater importance in determining the useful life of a rail than is beam strength.

With the re-design of the heavier rail sections, opportunity has been taken to incorporate, in a revised standard for fishplates, the considerable experience gained since the previous series was devised. Since fractures in fishplates frequently originate at the very top, the new fishplates have been designed to minimise the stresses at this point, by using the largest practicable radius and raising the neutral axis. To achieve this, the bolt holes are located slightly below the neutral axis. The contour of the top of the fishplate is such that contact between it and the flange of a fully worn tyre could only occur under the abnormal combination of maximum rail headwear and sidecutting.

It has been found that fishplates with high lateral rigidity fail to flex slightly as differential fishing table wear takes place and in consequence do not give full support at the rail ends. For this reason, the angle type of fishplate has not been perpetuated in the new "A" series.

The standards were approved by the Iron & Steel Industry Committee and endorsed by the Chairman of the Engineering Divisional Council, and were published, under the General Council of the British Standards Institution on February 25.

### Indian Railway Testing and Research, 1957-58

WE have received from Mr. S. L. Kumar, Director Research, Indian Railway Board, a copy of the fourth report on the work of the Research Centre for the year ended March 31, 1958, the sixth year of its existence. One of the problems causing most concern was the weakness of rails at the fish-bolt holes. With regard to their residual fatigue, the report points out that apart from such factors as the range of stresses, the "shape" of the load cycles, recuperation, and high-contact stresses, this form of failure is a chance occurrence having a microscopic basis, making the assignment of residual life of rails in service extremely difficult. In fact, new techniques would seem to be called for, and in this connection the United States National Bureau of Standards is quoted in the report as observing an exudation in the case of low-carbon steels and some other metals in certain conditions before the stage of fatigue is reached.

With regard to the induction of a pre-stress to balance secondary stresses arising from the rigidity of joints in triangular bridges, observations are being made on the new Mokameh Ganges Bridge to ascertain the extent to which theoretical possibilities of such balancing can be realised in practice. Plant for manufacturing pre-cast concrete products on a long-line basis and a bed has been installed at the Research Centre at Lucknow. Trials also continued with block-type concrete sleepers as well as others of the prestressed type. Electric strain-gauge testing is being carried out on 90-lb I.S.R. and R.B.S. rails. So far the maximum stress in the former under vertical loads is shown to be somewhat lower than in the latter, which is ½ in. shallower. Furthermore, a notable cell is in use for measuring vertical and lateral forces transmitted to sleepers. A modified machine has also been designed and installed for testing rolling-load fatigue in rails.

On the mechanical side attention is being devoted to strain-gauge tests on wagon underframes and to the riding-comfort of coaches. As well as the riding-fatigue index the effects of noise are being considered. Important tests are also in hand on three different types of coach bogies: (1) Indian State Railways; (2) Schlieren (Swiss); and (3) M.A.N. (German). After preliminary trials, suitable riding-quality measuring instruments were devised. Subsequently tests at speeds up to 60 m.p.h. were completed and further tests at up to 70 m.p.h. were in hand. Results show a marked superiority of the M.A.N. bogie between 55 and 60 m.p.h., especially in lateral oscillation. Stress tests on metre-gauge central buffer-couplers were also continued. Performance and capacity-rating trials were undertaken on the Grand Chord main line of the Eastern Railway, with 1,800-h.p. Co-Co type Alco diesel-electric locomotives.

## Better U.S.A. Results

(By a correspondent)

**A**N improvement in the U.S.A. railroad position began tentatively in October and is gradually gathering strength this year, though January statistics were somewhat abnormal. Operating revenues were \$4,475,070, or 0.6 per cent over 1958, but the increase came from passenger, mail, and parcels receipts and other sources than freight traffic. This anomaly is not likely to be repeated, as in 10 weeks to March 7, the railroads hauled 256,790 more loaded wagons than in 1958. That increase of 4.8 per cent may be compared with the Regional Shippers Advisory Boards' forecast that about 6 per cent more wagons would be loaded in the first quarter of 1959. The Boards overestimated the output of the coal mining and steel industries, and, on the other side of the account, did not foresee that grain loadings would expand in 10 weeks by 37,270, or 7.5 per cent, to a record figure for the period of the year.

Operating expenses in January were reduced by \$6,546,280, or 1 per cent, and the operating ratio for the month was 82.2 per cent against 83.5 per cent last year. Earnings (before changes) rose by \$4,245,195, or 13 per cent, to \$36,160,070 and net income (after charges) was \$22,000,000, an increase of \$4,000,000, or 22 per cent. No less than 32 railroads, however, reported deficits, including the Pennsylvania, New York Central, Baltimore & Ohio, and New Haven in the Eastern District. In contrast the Santa Fe, Burlington, Southern Pacific, Union Pacific and other lines operating 53,560 miles of road in the Central Western Region increased their earnings by 24 per cent.

For the second quarter of this year the Advisory Boards

reckon that 706,740 more wagons will be required than were loaded in 1958. This forecast is based on the anticipated forwardings of 32 commodities, ranging from coal, ore, iron and steel, timber, grain, and flour to fruit, canned goods and salt. A supplemental forecast covering 25 other traffics passing in smaller volume raises the possible demand for additional wagons to 736,310, or roughly 12 per cent over actual loadings last year.

The railroads have let the wagon stock run down and may have to adopt vigorous measures to replenish it. At March 1, they owned 1,721,800 wagons; 157,870, or 9.2 per cent of the stock, were under repair. They were thus left with 87,630 fewer serviceable wagons than they had a year ago. Only 32,400 new wagons were on order, half of the number scrapped in the previous twelve months. It would be disastrous to have a repetition of the wagon shortages in 1955 and 1956 when traffic volume expanded after the 1954 recession.

A rolling stock problem, which may become acute, arises from the rapid expansion of services for carrying road trailers on railway flat wagons. In 1958 the number of wagons used in these services was 276,770 for carrying 420,000 road trailers. For the first 10 weeks of 1959 the number of loadings increased by 50 per cent and in the week ended March 7 the record number of 7,772 "flats" was recorded—3,059 or 60 per cent, above the same week last year. These "flats" average 175 miles a day, compared with an average mileage of about 47 for all wagons; some of them travel as much as 450 miles a day. This speeding up of traffic movement may popularise co-ordinated road and rail transport, but the decisive test of success must be the amount of net revenue accruing to the railroads after all expenditure incurred on special wagons and terminal facilities has been taken into account in addition to other operating expenses.

## LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of Correspondents)

### London-Paris Rail/Air Services

April 23

SIR.—I was interested to read in your March 27 issue of the "Silver Arrow" service to be provided between London and Paris, taking advantage of the new Kent Coast electrification scheme for transport of passengers between Victoria and Margate. This facility is bound to gain rapid public approval as it is 6s. cheaper and some 2 hr. quicker than the rail/sea route via Dover and Calais.

Something similar might be arranged by the Eastern Region, whose electrified Liverpool Street - Southend Victoria route passes Southend Airport between Rochford and Prittlewell Stations. It might be possible to construct a halt near the airport, or failing this to run a bus service from one of the stations mentioned to the airport, whence the air journey takes half-an-hour.

The planes from Southend could be met by a bus at Calais Airport and the passengers transferred to Calais Ville Station to connect with the S.N.C.F. trains to Paris. An overall journey time of 7 hr. should be quite practicable, and the construction of a halt at Southend Airport might make it possible to reduce this. The train service on the British side would be adequately covered by the existing hourly fast trains, but if traffic developed to any great extent the provision of a special unit to operate the service might be considered. A fare of about £9 would prove attractive.

The thickly populated area of North-East London would benefit, as residents there travelling to France at present must allow up to 1½ hr. journey to Victoria, plus the 9 hr. thence to Paris. By way of comparison with such a 10½-hr. journey, last September, using ordinary scheduled train and plane services without booked connections, I travelled from Romford to Paris in 6½ hr., leaving Romford at 3.30 p.m., and connecting at Calais Ville with the 6.9 p.m. "Golden Arrow" to Paris,

arriving 9.45 p.m. A similar journey via the Dover-Calais short sea route would have necessitated a departure from Romford at 11.30 a.m.

Yours faithfully,

F. GLADWIN

30, Woodlands Road,  
Romford, Essex.

### Design of Railway Steamers

April 20

SIR.—Not content with protruding long stove pipes out of the funnel of the car-ferry *Lord Warden*, the squat funnel of the *Maid of Orleans* has now been embellished by the Southern Region of British Railways with a kind of "snorkel" in the form of a cobra-hooded cowl.

How "contemporary" can we get? Apparently, in this age of aero-dynamics and unrivalled test-tank opportunities, it is beyond the skill of British marine architects to design a funnel for a vessel tall enough to avoid covering its after portions in smuts. And yet when ignorant people like myself suggested that the squat funnels which are appropriate to a diesel vessel might not be so good for an oil-burning turbine, we were put most severely in our place.

The results are truly farcical, and the present ensemble of Clown-steamers which ply upon the Short Sea routes in succession to some of the loveliest vessels ever designed for Cross-Channel service are no doubt intended to convince our French friends that the English possess a sense of the ridiculous?

For myself, for whom for 40 years a Channel crossing by steamer has been one of life's joys, I travel henceforward—unless it be to Ostend, where they still design vessels with some regard to aesthetic considerations—by air.

Yours faithfully,

HENRY MAXWELL

106, Ashley Gardens, S.W.1

## THE SCRAP HEAP

### Traffic in the Antipodes

In an average working day the New Zealand Government Railways carry: 80,000 head of sheep and cattle; 10,000 tons of coal and timber; 4,500 tons of fertilisers; 17,500 tons of grain, fruit, meat, butter, cheese, wool, petrol and miscellaneous goods; 10,000 long-distance passengers; and 70,000 suburban passengers.

### Electric Motor for First Tube Line

The accompanying illustration shows Mr. A. V. Sowman, Managing Director, Crompton Parkinson (Chelmsford) Limited, at the Science Museum, South Kensington, pointing out features of the 500-V. d.c. Crompton motor which he had just presented to Dr. T. C. S. Morrison-Scott, Director of the Museum. Presenting the motor, which came from a City & South London Railway locomotive, Mr. Sowman expressed the hope that modern generations would understand that this motor was built while the electrical manufacturing industry was still in its infancy.

Between 1897 and 1901, Crompton & Co. Ltd. built 31 locomotives for the C. & S.L.R., the first deep-level underground ("tube") electric railway in the world. All were of similar construction, with two gearless motors of which the armatures were mounted directly on the axles. The cast-steel magnet frames of the motors were split diagonally to facilitate dismantling, and suspended by springs on the locomotive frame. Although the armatures were on the axles, the locomotive frame was carried by laminated springs in the usual way on the axleboxes so that the motor bearings had only to carry part of the motor weight and to maintain alignment of the armature. In the floor of the cab, removable glass windows protected by grids were fitted above the motors so

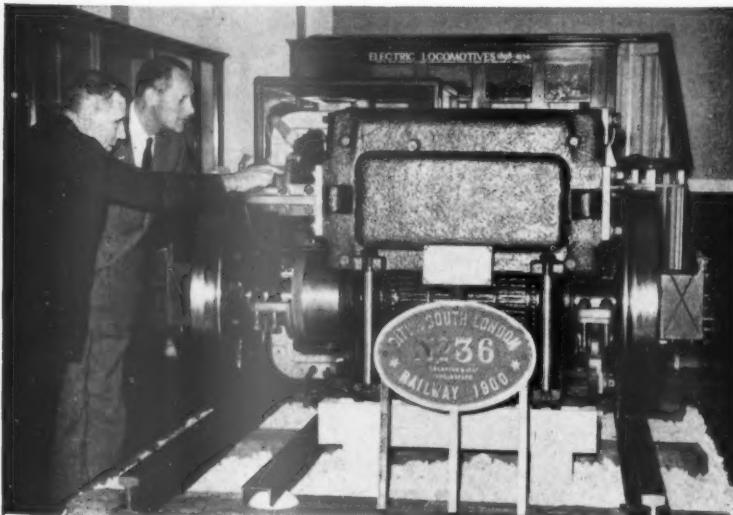
that the driver could see the brush gear and commutators at any time, and also so that the brushes themselves could be renewed from inside the cab.

The motors were designed to run in either direction in all conditions of load without moving the brush gear and without undue sparking. They could develop 50 b.h.p. at 310 r.p.m. or 25 m.p.h. with 27-in. wheels. Average running current was 50 amp. and average speed including stops 11½ m.p.h.

### Cornwall: Opening of Saltash Bridge

On seeing the working drawings of this bridge, some time since, the Prince Consort was so impressed with the ingenuity of the design that we believe he determined to have a small copy of it erected at Balmoral, and at the same time signified his intention of opening the bridge at Saltash himself. The occasion was quite worthy of this honour, and it is only to be regretted that Mr. Brunel, who designed and carried out the work, was prevented by ill health from being present at such a ceremony.

The Prince Consort arrived at Saltash at 12.20 on Monday, when addresses were presented. Immediately after His Royal Highness's reply, the train moved forward, and entered the Albert Bridge. The pace was slow, in order to give opportunity of surveying the extraordinary work. As the train went on a slight vibration was perceptible, yet, strange to say, much less than was observed when a company of soldiers, tramping in regular step, crossed it a few minutes before to the Saltash side. As the engine passed under the standard of the centre pier, a salute was fired from a battery of artillery on the hill. The train then continued its course through the Saltash station, where some thousands were assembled, who gave His Royal Highness a most enthusiastic welcome . . . His Royal Highness



At the Science Museum, South Kensington, after presentation of the 500-V. d.c. motor from a City & South London Railway locomotive

### BRISTOL & EXETER RAILWAY.

### VISIT OF HIS ROYAL HIGHNESS THE PRINCE CONSERVATOR TO THE OPENING ROYAL ALBERT BRIDGE, AT SALTASH, MONDAY, 2nd May, 1859.

### ROYAL TRAIN TIME BILL.

DOWNT.	UP.	
	M.	AM.
WINDSOR	8 0	8 15
Bristol	8 45	9 35
Taunton	9 30	10 25
Bristol	10 35	11 30
Newton	11 10	12 05
Cornwall Junction	12 05	12 55
SALTASH	12 15	12 50
RALSTON	Cornwall Junction	—
Newton	—	8 50
Easter	—	8 15
Taunton	—	9 15
Bristol	—	10 5
WINDSOR	—	10 15

The following arrangements will be necessary for the proper working of the Train, which must be strictly attended to . . .  
The 120 a.m. Dover Passenger Train is to start at Tiverton Junction.  
The 10 a.m. Goods Train Down will not start from Bristol until after the Royal Train.  
The 12 p.m. Up Train is to start at Tiverton Junction.  
The 2.30 p.m. Short Train from Weston is to start at Yatton.  
Bristol, 20th April, 1859.

Photo courtesy]

[Railway Club

### Working notice of Prince Consort's special train, May 2, 1859

alighting, proceeded on foot to examine the wonderful proportions of the Albert Bridge in detail. For this purpose he was attended by Mr. Brereton, Mr. Brunel's superintendent engineer, and Mr. Woolcomb, one of the directors. Accompanied by these gentlemen, the weights and dimensions of the bridge were briefly and clearly explained, together with the unexampled nature of the difficulties which Mr. Brunel had almost day by day to overcome during the progress of the work . . .

When the whole bridge takes its bearings, as it is termed, the pressure on the centre pier foundation will be more than eight tons to the foot, or double the pressure of the whole mass of the Victoria Tower on its basement story. Lateral motion is counteracted by the transverse floor girders under the roadway, and the balance checks vibration. Six inches have been allowed for contraction and expansion, but the greatest difference yet observed between the coldest and hottest day has only been three inches in the entire length of both spans. The total quantity of wrought iron used has been 2,700 tons; of cast iron 1,300 tons, of masonry and brickwork 17,000 cu. yds.; and about 14,000 cu. ft. of timber.—  
From The Railway Times of May 7, 1859.

### Sleeper Statistics

The German Federal Railway possesses a total of about 110,000,000 sleepers, of which 60,000,000 are wood, 40,000,000 steel, and 10,000,000 concrete. In an average year 4,250,000 wood sleepers are taken out, of which about 1,100,000 are re-used in sidings or small branch lines; and 1,985,000 new wood sleepers are laid. Total life of a wooden sleeper is reckoned as up to 40 years.

## OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

### INDIA

#### Passenger and Goods Revenues

Forty-eight million more passengers travelled by rail during 1957-58 compared to the previous year, according to the Railway Ministry's annual report. The total for the year was 1,431 million passengers. The number of passengers that boarded trains averaged 4,000,000 daily. The railways carried an average of 364,000 tons of goods in each 24-hr. period, while the loading of goods exceeded a steady average of over 1,000 wagons per hr., all the year round.

Out of every rupee which the railways earned during the year, passengers contributed 31 naye paise and goods traffic 61 naye paise. The balance came from parcels, luggage, and miscellaneous sources. While passengers contributed less than one-third of the total revenues compared to two-thirds from goods traffic, the former utilised a major portion of the total rail capacity.

### VICTORIA

#### Automatic Level Crossing Gates

The eighth installation of automatically operated boom barriers on Melbourne suburban lines has been made at Moonee Ponds on the main northern route. Of the seven previously installed one is at Glenroy on the same line, one is at Tooronga on the East Malvern line, another at Hampton on the Sandringham line, while there are four on the eastern route between Melbourne and Ringwood. These are at Heatherdale, Nunawading, Laburnum, and Box Hill. This form of level crossing protection is also to be used in the provincial city of Ballarat where three sets are to be in operation by next June.

#### Resources Train Tour

The fifty-third Reso (resources) train left Melbourne on March 6 last for a tour of major State and commercial enterprises in North Eastern Victoria.

Such tours were instituted by the Victorian Railways years ago to give industrialists, primary producers, and others an insight into potential State development and to show its natural resources.

Those taking part in these tours live on the trains, have special telegraphic facilities, a mail bag, and a regular delivery of Melbourne newspapers. A dining and kitchen car and sleeping cars are in the train's make-up, and it is equipped with hot and cold showers. Some travelling is done at night time, otherwise it is shunted onto sidings in the station yards of the places visited.

The five-day tour included inspection of the Hume Weir, Rutherford Research Station, Mount Buffalo National Park, the Kiewa Hydro-Electric Project, and the rayon and woollen industry at Wangaratta.

### QUEENSLAND

#### Townsville-Mount Isa Reconstruction

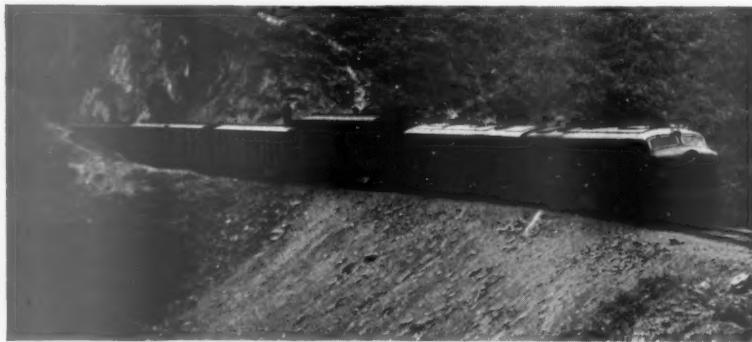
Agreement preparatory to a request for a £A22,000,000 loan from the World Bank for the reconstruction of the Townsville-Mount Isa line was announced recently by Mr. G. Nicklin, Premier of Queensland. The State Government, he said, and Mount Isa Mines were now ready to sign an agreement under which Mount Isa would almost double its production to send out by rail 14,000 tons of ore daily.

Mr. Nicklin has informed Mr. Menzies, the Prime Minister, of the agreement that has been reached. He said he was anxious for Mr. Menzies to press the claim for a loan from the World Bank during his forthcoming trip abroad.

In Parliament, Mr. Menzies commented that application for a loan largely depended on negotiations proceeding between the company and the Queensland Government.

Mount Isa Mines announced recently that it had begun expanding its copper smelter at a cost of £A3,250,000 to

#### Freight Working in Peru



Goods train hauled by two Alco "World" class Co-Co locomotives, on Matarani-La Joya branch, Southern Railway of Peru

double its capacity to 80,000 tons a year. Mr. G. Fisher, the Chairman, also announced that work would begin this year to increase the capacity of the new Townsville copper refinery from 40,000-60,000 tons a year. Major expansion of the copper smelter at Mount Isa would take about 18 months. It is estimated that the company's spending on development will exceed £A20,000,000 over the three years since 1956.

Mr. Fisher said that if the Townsville-Mount Isa line project proceeded, copper production would rise to 100,000 tons a year, entailing further expansion of smelting.

### NEW ZEALAND

#### Progress on Westfield Yard

Contractors are expected to finish major earthworks for the Westfield marshalling yard near Auckland, within the next few weeks. Most of the work of reclaiming the mudflats which formed part of the site of the yard has been completed. The yard will be the biggest in New Zealand, and able to deal with some 2,000 wagons. Electrical control equipment is to be installed.

### CANADA

#### Construction of C.N.R. Montreal Yard

Work will begin shortly on three control cabins, two compressor buildings, and a staff building in the new Montreal hump yard of the Canadian National Railways. The three control structures will have four storeys. The top floor of each, where the yardmaster will be located, will have glazed sides. The compressor buildings will house the equipment for compressing the air for actuating hump retarders.

### UNITED STATES

#### Overheated Wagon Axleboxes

Concern is being experienced in the United States at the high rate of axlebox overheating in freight service. In 1956, during the month of December, in every 438,425 miles of freight train operation one wagon had to be set out of a train for hot box trouble; in 1957, the corresponding mileage had improved to 462,475; but in 1958, the figure had dropped to one set-out per 350,091 miles.

For this reason the installation of automatic lineside hot box detectors, which locate axleboxes in passing trains in course of heating up, and by electrical connections with adjacent control offices enable remedial action to be taken in time, is growing in popularity. Three examples of one such detector, installed on a certain main line, detected 1,053 journals in passing wagons that were overheating, 1,037 of which required maintenance attention. Although only seven of these boxes were actually on

fire, many others revealed defects which might have caused serious trouble unless detected in time.

The Pennsylvania Railroad, having experimented successfully with a hot box detector that automatically sets to danger the next stop signal ahead of a train so affected, thus making possible immediate examination, is to install 10 further detectors of the same type.

## BRAZIL

### Staff Costs

The National Railways has announced that the new Minimum Salary Law and the bonuses, imposed by legal enactment, have entailed an increase of 3,500 million cruzeiros in the staff pay roll of the incorporated railways, although the number employed was reduced by 3.5 per cent between 1957 and 1958, to 139,854 last year.

### Passenger Service Improvements

Air-conditioned railcars are now running on the Central Brazil Railway between Rio and Juiz de Fora, Minas Gerais, shortening the duration of the journey by 2 hr. to 4 hr. 40 min. Pullman saloon cars, equipped with air-conditioning and separate armchairs, have been introduced on Central Railway Rio-Sao Paulo line.

### New American Loan

Under the 1956 agreement with the United States for the sale of American surplus farm stocks the Brazilian Bank for Economic Development has received a loan of 2,344,662,549 cruzeiros, part of which is to be used for building a line

between Passo Fundo and General Luz in Rio Grande do Sul. The agreement provided for payment in cruzeiros for wheat and other produce, purchased by Brazil, 85 per cent of the cost to revert to Brazil in the form of a loan to finance development projects. A previous loan under the 1956 agreement was for 1,510,815,152 cruzeiros.

## FRANCE

### Rates System Under Study

With the aid of electronic equipment, the French National Railways is studying a possible basic reform of the freight rates system. Details are not at present available, but it seems likely that any change will be towards a simplification of procedure. Proposals will have to go before the Minister for approval, and considerable delay is likely before changes come into operation.

## ITALY

### New Luxury Trains

With the introduction of the summer train service a new three-coach high-speed diesel train will start running between Milan and Turin. First-class passengers only will be carried, and the accommodation and appearance of the train will be generally similar to that of the Italian-built T.E.E. trains, such as the "Lemano." There will be seating for 150 passengers, and restaurant facilities. Two 490-h.p. diesel engines can move the train at 43 m.p.h. up a gradient of 1 in 66 and 87 m.p.h. on the level.

The first-class streamline trains "MR" and "RM" between Milan and Rome, on

a 5 hr. 55 min. schedule, hitherto have been run during the summer and mid-winter seasons only. A new train is now under construction for this service, and will permit daily operation throughout the year. The other similar luxury train, the "Vesuvius Arrow," also on a 5 hr. 55 min. schedule, already runs through the year without interruption and runs through to and from Naples.

## IRELAND

### Reconditioned Offices at Amiens Street

Since the absorption into Coras Iompair Eireann of the Great Northern Railway lines and plant in the Republic, the station and offices at Dublin Amiens Street, terminus of the former G.N.R. (I.), have been modernised and redecorated as part of the C.I.E. drive for brighter transport premises. The offices were visited recently by Mr. M. Hilliard, Parliamentary Secretary to the Minister for Industry & Commerce, who was accompanied by Dr. C. S. Andrews, Chairman of C.I.E. Mr. Hilliard expressed the hope that the new offices would enhance the morale of the staff and make businessmen realise that C.I.E. was an enterprising organisation which could give them useful, specialised advice, and help in all their problems.

Referring to a new remote control dictation system, he believed C.I.E. was the first Irish firm to adopt the system on a large scale. In this system letters are dictated into telephones and recorded in a central typing room. The recorded spools are distributed to over 20 typists in the typing bureau which handles work which previously called for the service of 38 shorthand typists.

## Publications Received

*Metal Industry Handbook & Directory, 1959.* London: Iliffe & Sons, Ltd., Dorset House, Stamford Street, S.E.1. 8½ in. x 6 in. 564 pp. Price 21s. A standard work of reference offering a comprehensive source of information to those connected with the non-ferrous metal industries. Information on the properties of the newer as well as more familiar metals is given, and the extensive section devoted to summaries of British Standard Aircraft Material, D.T.D., and Admiralty specifications has again been included. Producers, stockists and factors of all basic metal products, metal working machinery and tools, and metal finishing equipment are listed in the Directory for Buyers. The Handbook also includes a section on the chief metal finishing processes and data regarding all the common rod, bar, sheet and strip products. This is the 48th year of publication.

*New Developments in Training.*—An unusual combination of practical and academic experience is contained in a booklet, "New Developments in Training," published by The Polytechnic Management Association, St. Katharine's House,

194 Albany Street, London, N.W.1, price 5s. Most of the contributions deal with industrial and commercial aspects of training and should be of value to businessmen and specialists who are concerned with communication and efficiency through the development of skills. One of the few fields in which British consultants have exported specialised knowledge to the United States is in training. Some of the chapters describe the work which has contributed to this achievement.

*Schako Couplers.*—With a history going back before the first world war, the Scharfenberg centre coupler is now known more or less all over the world, principally because it was the first multi-purpose automatic coupler, these features of electric and pneumatic circuit couplings being added to the mechanical coupling in the late 1920's, and applied since to all forms of diesel and electric motive power, and even to steam locomotives. A 24-page colour-illustrated book with the text in German, English and French, describes the development of this coupling, and the various forms available, and gives illustrations of different applications. Another book, with the text in German, gives dimensioned drawings

of the models currently made for multiple-unit electric trains and multi-coupling of diesel railcars and control trailers.

*1859-1959: Centenary: Royal Albert Bridge, Saltash.*—The Western Region of British Railways has issued an admirable two-colour brochure in connection with the centenary celebrations marking the opening of Brunel's great bridge over the River Tamar. It is priced 1s. 6d., and any profit from the sale will be given to the Western Region "Helping Hand" Charity Fund. With reproductions of old engravings, coats of arms, and so forth, it forms an attractive souvenir.

*Self-adjusting Arc Welding of Aluminium.*—The British Aluminium Co. Ltd., 15-page booklet, "Self-adjusting Arc Welding of Aluminium and its Alloys," contains sections giving detailed information on equipments available, preparation of material for welding, shielding-gas flow, selection of electrode wire, welding technique, and weld strength and efficiency. There is much tabulated data and clear illustrations are used. Copies may be obtained from the British Aluminium Co. Ltd., Norfolk House, St. James's Square, London, S.W.1.

## Modified Blanketing

*Method of reducing costs in remedying one form of track failure by modifying conventional methods*



*Advanced erosion failure between Lye and Cradley, Stourbridge-Birmingham line, where slurry has almost reached tops of sleepers*

PERMANENT way engineers are fully acquainted with failure of soil formation beneath railway tracks and with the remedial measures commonly used for these failures.

In the author's experience, however, the essential differences between the various types of failure has not always been so clearly understood and, as a preliminary to the subject of this article, a classification of the main types of failure normally experienced perhaps may be made with advantage.

Two main types of failure can occur: pumping and strength.

### Pumping Failure

Pumping failure is the most easily-recognisable type. It embodies well-known outward symptoms, i.e., slurry in the vicinity of sleepers and especially near rail joints.

It is important to note that no failure occurs until the slurry reaches sleeper underside. The track is as stable as though failure had not existed. In the normal course of track maintenance, this important fact may not have been apparent, but during special study carried out on some 50 examples of this problem by the soil mechanics section of the Civil Engineering Laboratory of the Western Region of British Railways, intensive questioning of inspectors and gangers together with simultaneous visual observation of actual track conditions has led to the establishment of this vital fact.

This sort of failure arises when clay or other fines present in the ballast voids immediately adjacent to the sleeper become wetted by rainfall.

As soon as the level of slurry so formed falls below the bottom of the sleeper (because of run-off to cess, dry weather, and so on) no further track movement occurs.

Pumping failure may be subdivided in the following two classes by virtue of the source of the particles forming the slurry:—

#### (i) Ballast or Local Failure

This occurs when fine particles derived

from attrition of ballast or from ash dropped from locomotive fireboxes and wind deposits accumulate and form a slurry in the presence of water in ballast voids. Such a failure is independent of the condition and nature of the formation although it may conceal the presence of clay slurry below.

#### (ii) Erosion Failure

This occurs when clay slurry derived from the soil formation below the ballast permeates to the underside of the sleeper. The upper

illustration on this page shows an advanced failure of this sort where the slurry has almost reached the tops of sleepers.

Erosion failure appears to be most severe on still clay or soft shale formations. It is thus not related to a lack of strength of formation material. Thus, in the centre of a deep cutting where the formation can be expected to be most hard, the greatest degree of pumping often occurs.

### Strength Failure

The characteristic symptom of this type of failure is the appearance of heaves of soil in the cess, six-foot way and, occasionally, in the four-foot way, with an associated dropping of track over long periods of time. This is illustrated below. Track movements have a notable time-lag in relation to wet and dry weather as opposed to the case of pumping failure, where there is relatively little time-lag.

In the absence of other kinds of failures, track settlement begins within two to six days of the onset of wet weather and continues four to 14 days after cessation of rain.

Failures of this sort most frequently occur in the cess at the inside of curves, the low rail being most frequently affected. The formation may be of clay, silt, or certain sands. In clays, strength failure occurs mainly in weathered and fissured material, i.e., through shallow cuttings, at the ends of deep cuttings, and on embankments.

### Remedial Measures

In the past, differentiation has not always been made between erosion failure in the pumping category and strength failure. Differentiation between erosion failure and ballast or local failure was normally made since this is usually visually clear from such signs as slurry colouration. Ballast cleaning or re-ballasting is the classic remedy for failures of the latter type.

As far as permanent remedial measures are concerned, it has been the practice to



*Strength failure: heaves of soil with dropping of track near Twyford*

treat these in the same way, namely, by deep blanketing. In the first instance, this results from a lack of knowledge of fundamental characteristics of each type of failure. Continuation of this practice probably arose from the reluctance of some railway engineers to attempt alternatives until they were thoroughly time-tested. Deep excavation with blanketing is a tried method and known to cure both forms of failure. Nevertheless, it is most expensive and causes considerable disruption of traffic. It was necessary, therefore, to seek adequate cheaper alternatives.

The fact remains that erosion and strength failures are two quite separate and distinct forms of formation failure. While the mechanics of each is still not fully understood, it appears fairly clear that erosion failure results from a process of attrition by the ballast of a hard or stiff formation material in the presence of water, while strength failure is almost certainly a form of shear strength failure due to over-stressing of softer formation materials.

### Strength Failure

At present, strength failure can only be cured by :—

- (i) increasing the strength of the formation,
- (ii) decreasing the stress on the formation.

Efforts to strengthen the formation are being actively pursued mainly by methods of drainage or injection. Thus, on embankments, horizontal sand drains have been installed to reduce the water table in the cess, while in cuttings, trials are being made with trenches backfilled with a blanketing material leading to the normal track drainage (where this is still functioning). The injection of various materials to the cess is also under current trial, and some four or five injection trials have been carried out. It is too early to give definite results for these but initial indications are that at least two methods are having a measure of success.

As far as decreasing stress on formation is concerned, the principal current method

The diagram illustrates a cross-section of a ballast system. At the top, two metal clips are attached to a horizontal wooden board. Below the board is a layer of coarse, irregular stones labeled 'TOP BALLAST'. At the bottom, there is a layer of smaller, more uniform stones labeled 'BLANKETING LAYER'. The entire assembly is shown against a background of dark, stippled ground.

Fig. 1—Replacement of layers with minimum excavation: 6 in. of blanketing material with 4 in. of top ballast

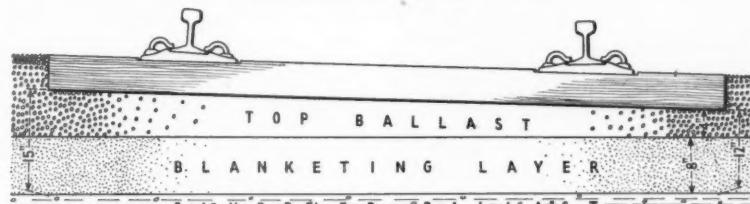


Fig. 2—Replacement with maximum excavation. Blanketing layer increased to 8 in. with top ballasting as before

consists of excavation to below existing formation level and backfilling with a blanketing material. A general lift would have a similar effect.

### Erosion Failure

In so far as erosion failures are concerned, while the interposition of a granular layer i.e., blanketing material after deep excavation, successfully prevents (i) initial attrition of formation, and (ii) movement of slurry up to the underside of the sleeper, and therefore is a complete remedial measure, the essential features of erosion failure noted at the beginning of this article must not be forgotten. Summarised, these show that

it is the essential presence of slurry in contact with the underside of the sleeper which constitutes failure. It therefore follows that avoidance of such contact will solve the problem. Such a solution does not require the complete absence of slurry in ballast.

It was on these basic facts that the remedial measure for erosion failure of "modified blanketing" was evolved. It consists essentially of placing between slurring formation and underside of sleeper a granular layer of such characteristics as to prevent the passage through it of a slurry, i.e., a blanketing material. The method is essentially not one of creating a vertically continuous granular layer from soil formation to top ballast. In fact, from observations made so

SIZE DISTRIBUTION CURVE - B.S.S. SIEVE			OUR REF.	D <sub>60</sub> =	INITIALS
BLANKETING LIMITS			YOUR REF.	D <sub>10</sub> =	DATE
SITE				U =	Sample No Museum
DESCRIPTION					
SOURCE			SUPPLIERS DEF.		
			Drg. N° 455/2 D.J.A./J.W.S.		

**LOG PARTICLE SIZE**

$\frac{3}{4}$	$\frac{1}{2}$	300	200	150	100	85	52	44	25	22	14	10	7	5	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	1	2	3
---------------	---------------	-----	-----	-----	-----	----	----	----	----	----	----	----	---	---	---------------	---------------	----------------	---------------	---------------	----------------	---------------	---------------	---------------	---	---	---

**B.S. SIEVE NUMBER**

**APERTURE SIZE, INCHES**

**SUMMATION PERCENTAGE BY WEIGHT**

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

Millimetres

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

20

10

0

100

90

80

70

60

50

40

30

<p style="text-align: center

Fig. 3—Size distribution envelope giving particulars of blanketing materials

far, it would seem only to need a minimum thickness of 4 in. to function satisfactorily, although a thicker layer normally would be recommended, where possible. Such a layer can be placed without removal of track so that, with the economy achieved through shorter occupations, temporary restrictions of speed, and the use of much less blanketing material; this method is very much cheaper than normal blanketing. Nevertheless, it must be stressed that it can only be used where erosion failure alone occurs. Normally, this would be verified by a soil mechanics investigation of the site.

#### Method

The actual process on site of modified blanketing involves mechanical or hand excavation of ballast only from 10 to 15 in. below bottom of sleeper level. This work is ideally suited to a mechanical ballast cleaner used in its alternative capacity as an excavator. The maximum depth necessary can be easily achieved using one or two passes of

blanketing layer can be increased to, say, 8 in., with subsequent top ballasting as before and as shown in Fig. 2.

Where excavation cannot reach 10 in. a lift of the track must be given to make up to this figure. The entire process carried out using a mechanical ballast excavator is essentially the same as a normal re-ballasting job except that a blanketing material and a ballast instead of ballast alone is used to backfill the track. In all cases this work must be accompanied by the installation of blanketed drains as in normal deep blanketing works.

It is not the purpose of the article to discuss the properties of blanketing materials which are common to both modified and to conventional blanketing methods, but it should be stressed that grading of blanketing material must be laid down and strictly adhered to if it is to function correctly, i.e., if it is to act both as a filter to the clay particles and to possess adequate strength against heavy stresses.

Some eight sites have been treated in this way on the Western Region, several as long ago as 1954. All sites on which the process has been used on which erosion failure only was occurring have been completely successful.

Before the essential difference between the two was fully understood, forms of modified blanketing were tried on sites which were failing by both cess heave, i.e., strength failure, and by erosion. On these sites, where work was carried out as early as 1951, strength failure still continues and is a clear demonstration of the futility of attempting to employ modified blanketing as a cure for strength failure of formation.

The table below shows some examples of sites at which modified blanketing has been carried out. It will be seen that, where failure was of the strength type, it inevitably continues.

The experience gained over a number of years from those successful sites on which erosion failure only was occurring shows

#### Examples of Relationship between Modified Blanketed Sites and Forms of Failure

Location	Type of Failure								Performance as reported by District Engineer's Office
Keinton Mandeville A	Ballast	...	...	...	...	...	...	...	Satisfactory
Keinton Mandeville B	Erosion	...	...	...	...	...	...	...	Satisfactory
Alford Halt A	Combined erosion and strength	...	...	...	...	...	...	...	Satisfactory but evidence of strength failure recurring
Alford Halt B	Erosion, severe	...	...	...	...	...	...	...	Satisfactory
Edington & Bratton A	Combined erosion and strength, severe	...	...	...	...	...	...	...	Failed, subsequently (strength), then deep blanketing: satisfactory
Edington & Bratton B	Erosion, severe	...	...	...	...	...	...	...	Satisfactory
Westbury	Strength, severe	...	...	...	...	...	...	...	Satisfactory, but evidence of strength failure recurring
East Usk Junction	Erosion and ballast	...	...	...	...	...	...	...	Satisfactory

the machine depending on the model available.

The actual depth of excavation is not of vital importance but, from practical considerations, minimum and maximum figures quoted of 10 and 15 in. are normally used. The minimum figure is necessary for reasons of adequate blanket thickness and maximum stress distribution, while the maximum figure is a function of the capacity of the mechanical ballast excavator used.

Where the minimum excavation is used, the replaced layers could be as shown in Fig. 1, i.e., 6 in. of suitably graded blanketing material with 4 in. of top ballast, incorporating suitable cross falls. Where the maximum excavation is employed, the

A size distribution envelope is shown in Fig. 3, and blanketing materials falling within this envelope have been found to be perfectly satisfactory for the main types of clays encountered on the Western Region.

As already stated, the cost of carrying out modified blanketing as opposed to deep blanketing represents considerable savings. Tentative figures show the cost per chain, excluding common drainage works, to be of the order of £70 for modified blanketing with a 15-in. excavation and £270 for deep blanketing. Time required for modified blanketing works approximates that needed for re-ballasting works and varies between 25 and 40 ch. per Sunday compared with about 5 ch. per Sunday for deep blanketing.

the value of the method as a most economical and long-term substitute for deep blanketing.

#### Acknowledgements

Article submitted by Mr. D. L. Bartlett, B.Sc. (Eng.), Head of the Civil Engineering Laboratory, Western Region, British Railways, who is indebted to Mr. M. G. R. Smith, Chief Civil Engineer, Western Region, British Railways, for permission to publish this article; to Mr. D. J. Ayres, Head of the Materials Section of the Civil Engineering Laboratory, Western Region, and to Mr. J. S. Harris of the Soil Mechanics Section of that laboratory for their valuable work in connection with the process described.

**RAIL BRIDGE TO BE BUILT OVER MOTORWAY.**—A bridge to carry the Luton-Dunstable line British Railways, London Midland Region, is to be placed in position before the end of May. The site is just south of and parallel to Bradley Road, Luton, where the motorway intersects the branch line. Although this branch has only a single track at present, allowance will be made in the construction of the bridge for the possible future doubling of the line, because of the anticipated industrial expansion in the Luton-Dunstable area. The bridge will have two spans both 85 ft. on the skew, the abutments will be of concrete and the central supports two circular reinforced concrete columns 4 ft. 6 in. dia. The superstructure of each span will weigh 440 tons and be formed of two welded steel main girders, with welded steel cross girders and a concrete deck. The main girders will be stepped over the central supports so that one span sits upon the other, thus the end reaction from each span at this point will be taken through the bearings down the centre of the columns. The superstructure will be erected and concreted complete on rolling-in trestles alongside the railway. Before May 31, 1959, it will be rolled in and jacked down into its permanent position. The sub-

structure work has been designed by Sir Owen Williams & Partners, Consulting Engineers for the Motorway. The superstructure has been designed by Mr. A. N. Butland, Chief Civil Engineer, British Railways, London Midland Region. Steelwork for the superstructure is being supplied and erected by Dorman Long (Bridge & Engineering) Limited, Luton, and the general works on the sub-structure and deck are being carried out by John Laing & Son, Ltd.

**DIESEL MAINTENANCE AT STRATFORD.**—As a temporary arrangement to increase accommodation at Stratford Motive Power Depot for diesel locomotives on the Great Eastern Line of the Eastern Region, maintenance and servicing is being carried out in the recently-built shed which it is intended should eventually be used only by diesel railcars. A new servicing depot at Stratford for main-line diesel locomotives is now to be constructed. This will consist of two sheds erected on part of the site of the existing "Jubilee" shed which will be vacated and demolished in stages. Construction of the new building will be staged to follow on the disappearance of the old. The new sheds will be of concrete portal

frame construction and will be clad with asbestos sheeting. Each will span four tracks and the capacity of the two combined will be 16 main-line locomotives. A depressed floor and the mounting of rails on piers and beams, will give two working levels. Workshops, offices, amenities, stores, and so on will be accommodated in a two-storey building between the sheds, an arrangement which it is believed will prove highly efficient. A locomotive-washing plant will be provided. Demolition work has already started and the depot should be ready for use early next year.

**SCOTTISH REGION AMBULANCE COMPETITION.**—In the final of British Railways, Scottish Region, Ambulance Competition held on April 21, at the St. Andrews Ambulance Association Headquarters, Glasgow, Bridgeton team won the Scottish Railways Shield. Eleven teams of railwaymen competed and the first three teams were, Bridgeton (Glasgow), 289½ points; Motherwell No. 1, 277 points; Falkirk, 240 points. In the preliminary stages 51 teams took part in the competitions. Mr. G. W. Stewart, Assistant General Manager, Scottish Region, presided and the prizes were presented by Mrs. Stewart.

## Type "4" Diesel-Electric Locomotives for British Railways

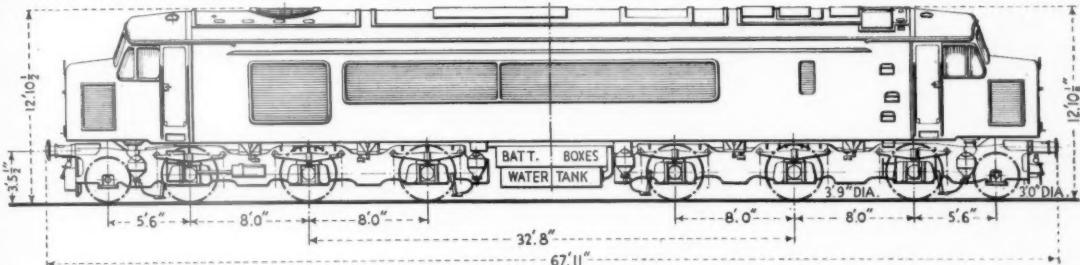
*Highest-powered diesel locomotive built in British Railways works: Sulzer double-bank 12-cylinder engine rated at 2,300 h.p.*



*British Railways Type "4" 2,300-h.p. diesel-electric locomotive with Sulzer engine and Crompton Parkinson electrical equipment*

THE highest powered diesel-electric locomotive yet produced in British Railways workshops is the Type "4" 2,300-h.p. Sulzer-engined locomotive recently completed at Derby. Ten of these are being constructed under the

The engine is a Sulzer 12LDA28 twin-bank turbocharged diesel, rated at 2,300 h.p. at 750 r.p.m. The generator is geared to run at 1,080 r.p.m. The first 10 engines are being supplied from Sulzer Bros. works in Switzerland and



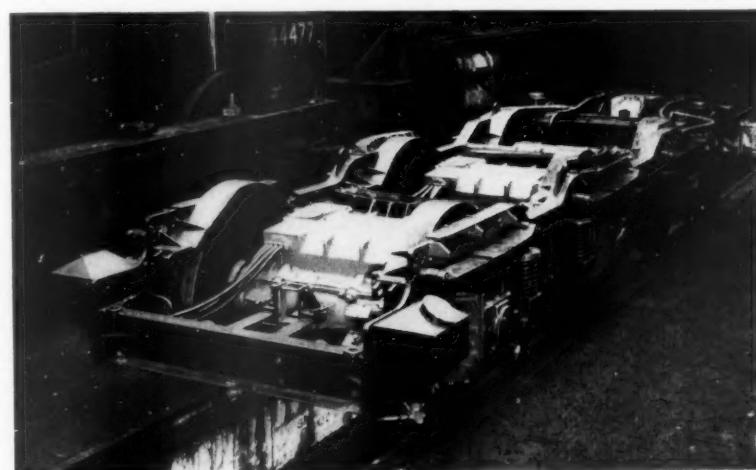
*Side elevation showing principal dimensions of Type "4" diesel-electric locomotive*

general direction of Mr. J. F. Harrison, Chief Mechanical Engineer, and Mr. S. B. Warder, Chief Electrical Engineer, British Railways Central Staff, British Transport Commission. The detailed design and supervision of construction are the responsibility of Mr. A. E. Robson, Chief Mechanical & Electrical Engineer, London Midland Region. The design has been co-ordinated with Sulzer Bros. (London), Ltd., and Crompton Parkinson Limited, which firms are supplying the diesel engine and electrical equipments respectively.

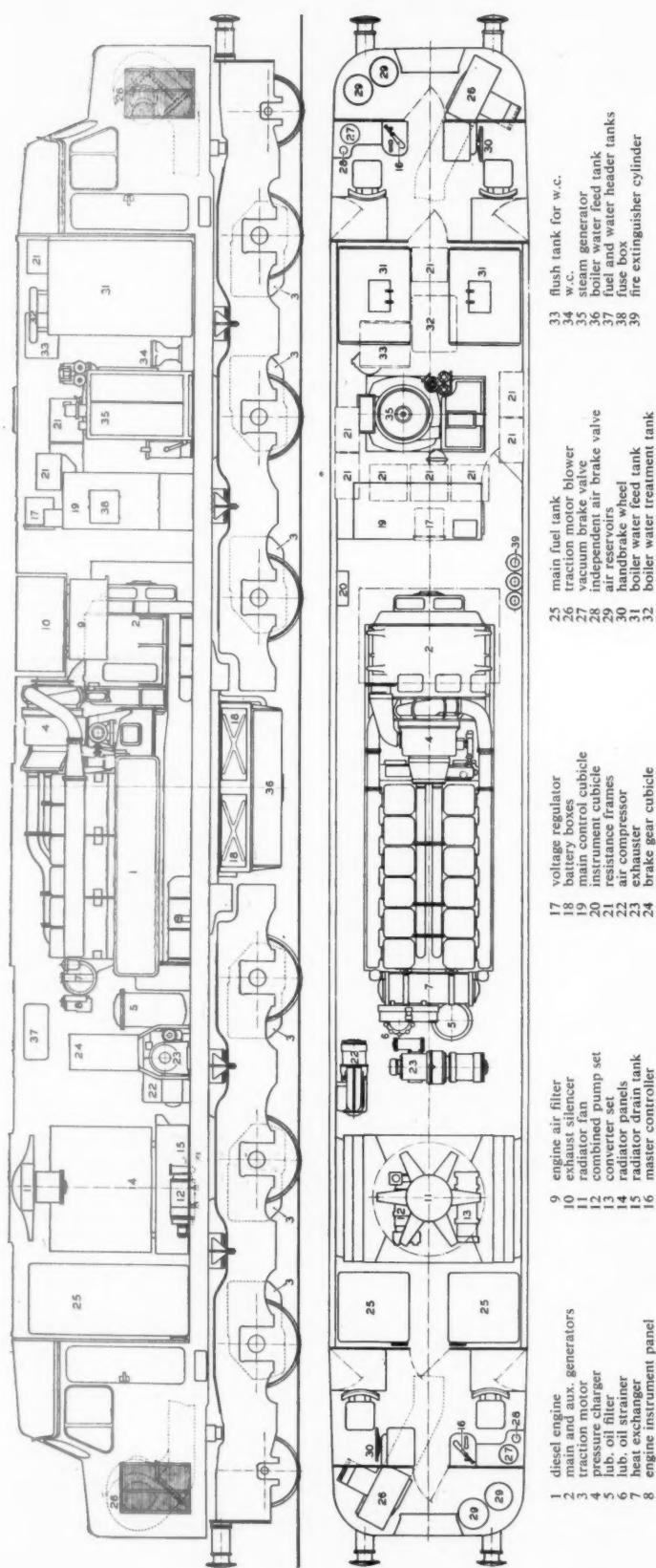
A total of 147 locomotives with similar equipment have been ordered and will be built at Crewe and Derby for operation in the London Midland Region. With a top speed of 90 m.p.h. the locomotive is equipped for multiple-unit operation with all British Railways locomotives fitted with British Thomson-Houston, English Electric, and Crompton Parkinson equipment. To meet the maximum axle loading requirement the 1-Co-Co-1 wheel arrangement has been adopted. The bogie is based on the design used by the Southern Region.

the remaining 137 are being manufactured by Vickers Armstrong (Engineers) Limited, Barrow-in-Furness to the

and demisting. Trico Folberth pneumatic wipers are fitted on the windows. The roof ventilators control the intake



*Inner end of bogie showing spring load applied direct to axleboxes. Segmental pivot bearings are above centre driving axle*



*Sectional side elevation and plan, showing general arrangement of power unit, other equipment, and controls*

of fresh air and also act as extractors. Heating is electric, as is the cooker.

At the driving position on the left-hand side are the master controller, straight air brake and vacuum brake controls. A button in the controller handle operates the anti-slip brake. On the instrument panel are the air and vacuum brake gauges, speedometer, and ammeter. Warning indicators on the driver's panel are confined to three lamps, showing engine stopped, wheel slip, and a pilot lamp to indicate that a fault lamp is showing on the power compartment panel. The hand brake wheel, boiler pressure gauge, and boiler fault indicator are at the assistant driver's position. The lighting switch panel is above the driver. There are Beclaw sliding windows at the side of each seat. Contents gauges for the fuel and water tanks are mounted on rear bulkhead.

#### Power Unit

The engine is the Sulzer twin bank 12-cylinder diesel type 12LDA28, rated at 2,300 h.p. at 750 r.p.m. The cylinders are arranged in two vertical banks of six. The crankshaft in each bank is geared to a common output shaft. This arrangement enables the generator to be driven at a higher speed than the engine, so permitting the smallest possible generator to be used. The main components in each bank are similar in design to those of the six- and eight-cylinder Sulzer engines used in the British Railways Type "2" and Type "3" locomotives, and many parts are interchangeable. The Sulzer turbo-blower at the drive end draws engine room air from a rectangular box fitted with panel type Vokes oil-wetted bonded-hair filters. Lubricating oil temperature is controlled by a Serck heat exchanger. The cooling water of this is in circuit with the engine jacket water; this ensures rapid warming-up of the oil when starting and adequate cooling for normal running. Before entering the heat exchanger the lubricating oil flows through a Knecht wire-wound full-flow filter. Also fitted is a large-capacity waste-packed Fram by-pass filter.

#### Automatic Temperature Control

The roof-mounted fan of the Serck cooling group is driven by a 21-h.p. two-speed Crompton motor. Switching-in of the fan and selection of speed are automatically controlled by a thermostat. Coolant circulation through the side-mounted radiator panels is also thermostatically controlled. When the radiator is by-passed the panels drain into base tanks to prevent freezing. To assist ventilation the radiator fan also draws air from the power unit compartment. The engine governing and generator excitation is arranged to ensure that the lowest possible engine speed is used for the required electrical loading at all positions of the controller.

#### Power Compartment and Superstructure

The body framing, in the form of a lattice girder with diagonal bracing, is welded to the underframe to form an integral load-carrying structure. There are no side windows or doors, but below

the cant rail ventilation louvres extend for the full length between the cabs. The engine silencer, shaped to the roof contour, is fitted in an external recess for maximum cooling, and the roof section over the engine and generator is detachable. Navy-board insulation is used to line the sheet-steel skin of the body sides and roof. Except for the train heating boiler and water tanks, the complete power equipment and auxiliaries are housed in one compartment. At the generator end is the Allen West Electrical control equipment cubicle. Adjacent to this is an auxiliary cubicle containing the instruments, operating switches, and engine protection units.

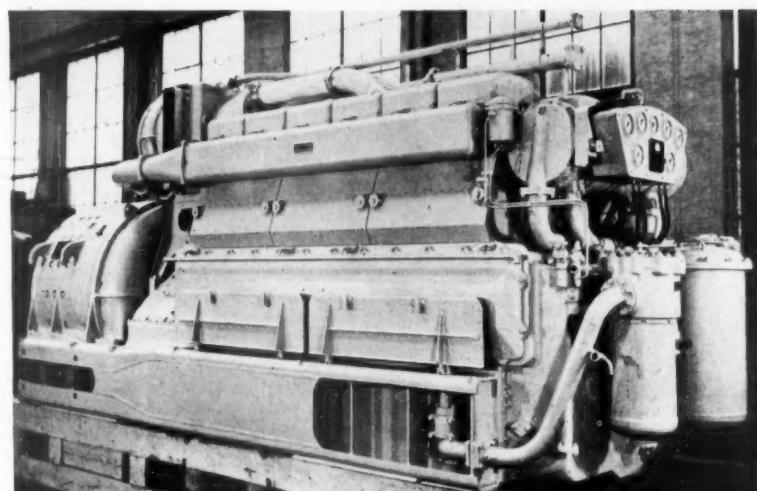
Mounted transversely at the free end of the engine are the S.L.M. vacuum brake exhauster and above this a cubicle housing the brake-equipment control valves. In the roof is a 15-gal. engine cooling water header tank and a 40 gal. fuel oil service tank. The air compressor is mounted at the bodyside.

#### Two Main Fuel-Oil Tanks

At the rear of No. 1 cab bulkhead are two vertical 400-gal. fuel oil tanks, with a central gangway leading into the cab. The radiator unit, the panels of which are cowled to louvres in the bodyside, is positioned adjacent to the fuel tanks.

Floor-mounted in the radiator tunnel is a rotary converter on one side and a combined oil and water pumping set on the other.

The converter is used to drop the auxiliary generator voltage from 220V.



2,300-h.p. Sulzer diesel engine and Crompton Parkinson generator before installation

to 110V. for the current supply to 110-V. equipment. The pumping set, driven by a Crompton motor, incorporates the engine-coolant circulating pump and pumps for lubricating oil priming and fuel oil transfer from the main to the service tank.

#### Bogies and Underframe

The bogies are generally similar to the design developed by the Southern Region, with three driving axles and an end load-carrying axle. The drag-box is built into the bogie frame, with the control

links of the pony truck axle anchored to the buffer beam. The pony-truck axles are carried in Timken split cannon boxes with roller bearings.

Standard spring-loaded side buffers and central drawgear are fitted. Laminated springs, with auxiliary coil springs on the links, apply the load direct to the Timken roller bearing axle boxes. The pivots are large-dia. segmental bearings carried on the bogie frame cross members. The lubricating pump is axle driven.

The side channels of the underframe are braced with cross members at the bogie support positions and by the engine subframe in the centre. A central box-form member extends from the subframe to the ends of the main frame. Besides carrying the load, this member forms a cooling air duct from the blower to the traction motors.

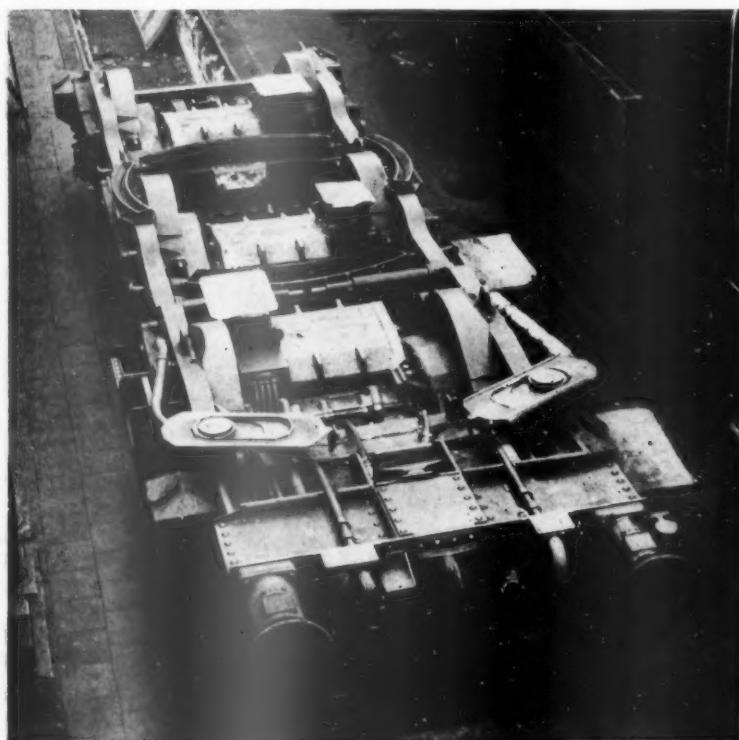
#### Braking

Brake equipment is of the Oerlikon type, supplied by Davies & Metcalfe, with straight air brakes for the locomotive and vacuum for the train. Two brake blocks are fitted to each driving wheel. Each is operated by a 6-in. dia. cylinder mounted on the cross members. The brake linkage is completely enclosed and slack adjusters are incorporated. The main and auxiliary air reservoirs are housed in the cab nose compartments. All pipework is carried below deck down one side of the locomotive.

Air for the brakes and controls is supplied by a motor-driven Oerlikon compressor. An S.L.M. two-speed exhauster is provided for vacuum brake operation. To reduce sanding an anti-slip brake is operated from the controller handle, and to facilitate uncoupling there is a locomotive brake release.

#### Generators and Traction Motors

The main generator is Crompton Parkinson self-ventilated 10-pole d.c., with a continuous rating of 1,531kW., 580V., 2,640A. at 1,080 r.p.m. The commutator and fan are at the driving end and the windings provide for self-excitation, separate excitation, de-com-



Bogies, showing dragbox and buffer beam at pony-truck end and segmental bearings of turntable type pivot



*Underframe, showing the curved ends of the side members joined to form a continuous 10 in. by 3½ in. channel, and central box-form member acting as cooling air duct*

pounding, and engine starting. The armature shaft is direct-coupled to the input drive gear at the front, and supported in a roller bearing at the rear. Mounted on the same rotor is the auxiliary generator armature. This generator is recessed into the main generator to reduce the overall length.

#### Rotatable Brushgear

The auxiliary generator is eight-pole, with a continuous rating of 90kW, 220V., 410A. A constant voltage is maintained at all speeds between 650 and 1,080 r.p.m. Cooling air for the generator is drawn from the power compartment. The Crompton rotatable type brush gear, to facilitate servicing from the most convenient position, is fitted on both generators. The auxiliary-generator 220-V. supply is used by the compressor, traction motor blowers, exhauster, and motor-driven pumping set. A rotary

converter drops the voltage to the standard 110V. used for lighting and control circuits.

#### Rubber Cushioning

The axle-hung traction motors have a continuous rating of 305 h.p., 440A., 580V. and a one-hr. rating of 305 h.p., 485A., 530V. The rubber-cushioned nose suspension of the motor driving the centre axle is arranged to allow the motor to float transversely with the axle. On the outer driving axles side movement is restricted by a chevron design of suspension anchorage.

Resilient gearwheels are fitted in the reduction gear to cushion the drive. Each traction motor blower, with a maximum delivery of 6,750 cu. ft. per min., supplies cooling air to the three motors on one bogie. The Aerex blower is driven by an 11.5-h.p. two-speed Crompton motor.

The traction motors are connected in permanent parallel across the generator. Five stages of motor field weakening are used. Cam-operated contactors are used for field weakening, traction motor control, and engine starting. Auxiliary equipment contactors are electromagnetic.

All cables are grouped at one side of the locomotive in a sealed duct. The 142 amp-hr. capacity lead acid battery is carried externally on the underframe in four draw-out boxes.

#### Train Heating Boiler

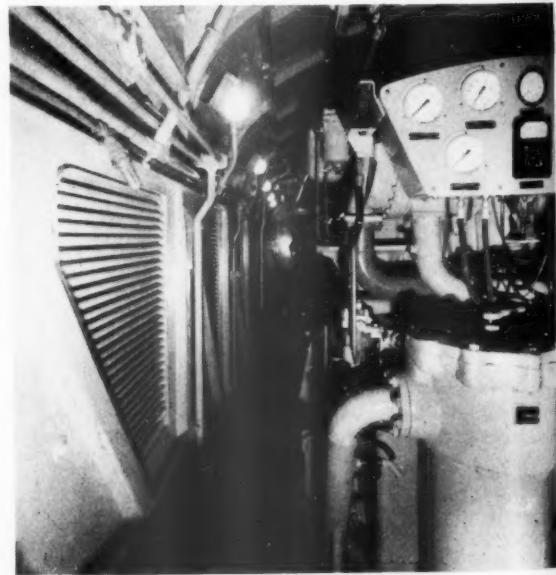
A fully automatic Stone-Vapor train heating boiler with a steaming capacity of 2,750 lb. per hr. is housed in a compartment adjacent to No. 1 cab. Water is carried in two 520-gal. tanks in the compartment and in a 300-gal. tank underslung from the frame.

Sub-contractors for the locomotive include:—

Electrical control equipment	Allen West & Co. Ltd.
Axleboxes	British Timken Limited
Wheels	Taylor Bros. & Co. Ltd.
Train heating boiler	J. Stow & Co. (Deptford) Limited
Batteries	Crompton Parkinson Limited
Radiators	Serck Radiators Limited.
Cab heaters	Cressall Manufacturing Co. Ltd.
Windows	Beckett, Laycock & Watkinson Limited
Engine air filters	Vokes Limited
Windscreen wipers	Trico-Folberth Limited
Speed and mileage recorders	Smith's Industrial Instruments Limited
Instruments and fuel gauges	Pyrene Co. Ltd.
Fire extinguisher equipment	Davies & Metcalfe Limited
Brake equipment	G. Turton Platts & Co. Ltd.
Buffers	Hallam Sleigh & Cheston Limited
Seats	Metalaistik Limited
Rubber suspension units	Silentblock Limited
Anti-vibration mountings	W. Gilmour Smith & Co. Ltd.
Sound insulation	Weathershields Limited.
Cab ventilators	Tecalemit Limited
Greasing equipment	



*Driver's position in cab, showing compact arrangement of controls and instruments*



*Gangway through power compartment, showing construction of fabricated side-frame members*

## RAILWAY NEWS SECTION

## PERSONAL

Mr. M. M. Khan, Senior Deputy General Manager, Western Railway, India, has been appointed General Manager.

Mr. A. B. B. Valentine, M.A., M.Inst.T., Member of the Southern Area Board, British Transport Commission, has been appointed Chairman of the London Transport Executive, in succession to Sir John Elliot, who is retiring on June 30. Mr. Valentine's ap-

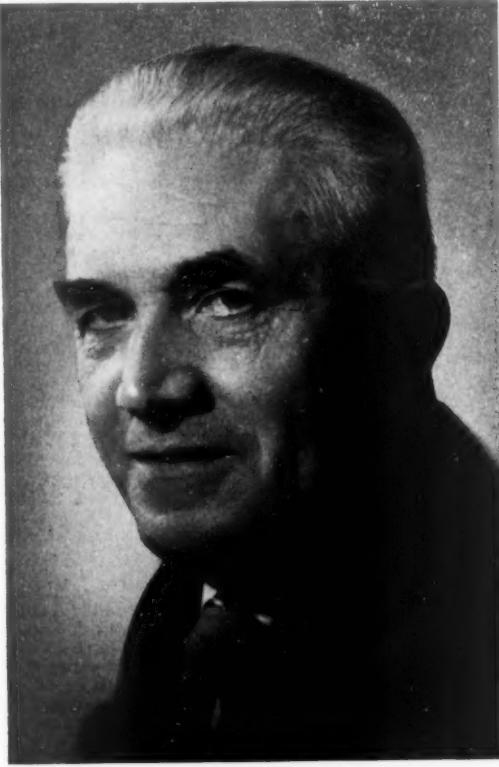
1948, he was appointed a full-time member of that body, responsible for operating and commercial matters. He later became a member of the London Plan Working Party, set up by the British Transport Commission. Mr. Valentine has appeared as commercial witness before the Transport Tribunal, and its predecessors, in connection with new charges schemes. He was elected a vice-president of the Institute of Transport in 1948, and was President, 1951-52. In that capacity he made a journey to Australia to

Mr. A. H. Grainger, Deputy Chairman, London Transport Executive, is to be Managing Director from July 1. In this capacity he will be responsible to Mr. A. B. B. Valentine, Chairman, for the day-to-day management and the co-ordination of all executive work. Mr. Grainger was born in 1897, and educated at the Regent Street Polytechnic. He joined the Traffic Department of the Metropolitan Railway in 1913, and, in 1914, was transferred to the Solicitor's Office. Mr. Grainger enlisted



Mr. A. B. B. Valentine

Appointed Chairman of the London Transport Executive



Mr. A. H. Grainger

Appointed Managing Director of the London Transport Executive

pointment will date from July 1, and will run concurrently with his appointment to the B.T.C. which ends in 1962. He was educated at Highgate School and at Oxford, where he took an Honours Degree in Classics in 1922. In 1928, after six years with the British Commercial Gas Association, as Deputy Editor of Publications & Publicity, he joined the London Underground group, and was engaged on publicity work until he became an assistant in the office of the late Mr. Frank Pick, then Managing Director. He was Mr. Pick's Personal Assistant when the London Passenger Transport Board was formed, and remained in that position until 1936. He was Fares Officer 1936-39, Commercial Officer 1939-43, and Chief Supplies Officer 1943-45. In 1946 he was appointed Chief Commercial Officer, covering both the traffic side and supplies. On the retirement of Mr. Evan Evans, Operating Manager (Railways), later in that year, he assumed that appointment additionally. In 1947 he became a member of the Railway Executive Committee. When the London Transport Executive was set up, in

take part in the Institute's activities there. He was awarded the Road Transport (Passenger) Medal in 1945. In 1955, he was appointed a member of the British Railways Productivity Council, and, in October last year, he became a member of the Coastal Shipping Advisory Committee. He serves on the governing body of the British Transport College for Higher Management, and is currently President of the Railway Students' Association. Mr. Valentine is a director of the Channel Tunnel Co. Ltd., Birmingham & Midland Motor Omnibus Co. Ltd., Britravel Nominees Limited, and Transport Nominees Limited.

Mr. K. J. Cook, Chief Mechanical & Electrical Engineer, Eastern and North Eastern Regions, Doncaster, British Railways, is retiring on June 30.

Sir Julian Pode, Managing Director, Steel Company of Wales, Limited, has been appointed to the boards of the Iron Trades Employers Insurance Association and the Iron Trades Mutual Insurance Co. Ltd.

in the Middlesex Regiment in 1917, served in France, and, after demobilisation, in 1919, rejoined the Solicitor's Office, Metropolitan Railway. He was appointed Personal Assistant to the Solicitor in 1923, and articled the following year. In 1929 he was appointed Managing Clerk of the Solicitor's Office, and an Assistant Solicitor in 1930. When the London Passenger Transport Board was formed in 1933, Mr. Grainger was appointed Assistant Solicitor (General), and, in 1937, Solicitor (General). From 1943 to 1945, he directly assisted the Chairman of the Board, and was appointed Solicitor in 1945. He became a member of the London Transport Executive in 1947, and was appointed Deputy Chairman in September, 1955. Mr. Grainger was President of the Railway Students' Association for 1957-58. In 1955 he visited the United States and Canada to study railway engineering methods.

We regret to record the death on April 24, at the age of 65, of Mr. K. R. Hopkirk, former Director, Chief Mechanical Engineer, British Thomson-Houston Co. Ltd.



Mr. S. W. Jesper

Appointed Assistant to the General Manager,  
North Eastern Region



Mr. F. Collingwood

Appointed Staff Assistant, Chief Mechanical &  
Electrical Engineers' Office, N.E. Region



Mr. W. E. Waite

Appointed District Operating Superintendent,  
Leeds, N.E. Region

Mr. S. W. Jesper, Public Relations & Publicity Officer, North Eastern Region, British Railways, who as recorded in our April 17 issue has been appointed Assistant to the General Manager of that region, is the youngest son of the late Mr. Charles Jesper, who was Chief Goods Manager, former North Eastern Railway. Educated at St. Olave's School, York, and Epsom College, Mr. Jesper served in the 1914-18 war and, after demobilisation, joined the North Eastern Railway, in 1920. After experience in various railway departments, he returned to York, in 1949, in charge of the then newly-created Public Relations & Publicity Department, North Eastern Region.

Mr. F. Collingwood, Joint Staff Assistant to the Chief Mechanical & Electrical Engineer and the Carriage & Wagon Engineer, North Eastern Region, British Railways, who, as recorded in our February 27 issue, has been appointed Staff Assistant, Chief

Mechanical & Electrical Engineer's Department, joined the North Eastern Railway, in 1918, in the Operating Department, Gateshead. Later that year he was transferred to the office of the Chief Mechanical Engineer, Darlington. Mr. Collingwood was appointed Chief Clerk, Darlington Locomotive Works, in 1944, and, four years later was moved to the North Eastern Headquarters Regional Staff Office. In 1955 he joined the Scottish Region as Joint Staff Assistant to the Chief Mechanical & Electrical Engineer and the Carriage & Wagon Engineer.

Mr. W. E. Waite, A.M.Inst.T., Head of Traffic Planning, North Eastern Region, British Railways, who, as recorded in our March 20 issue, has been appointed District Operating Superintendent, Leeds, joined the London & North Eastern Railway at Bardon Mill in 1925. After experience at stations and district offices, Mr. Waite served

a three-year traffic apprenticeship from 1930. At the outbreak of the 1939-45 war he was Assistant Yardmaster at Hull. Later he served with the Royal Engineers in Persia and Iraq, and, towards the end of the war, was in command of Movements & Transportation in Syria and the Lebanon. He attained the rank of Lieutenant-Colonel. Since the war Mr. Waite has been Yardmaster, Lincoln; Assistant to District Operating Superintendent, Nottingham; Acting District Operating Superintendent, Leeds Central; Productivity Assistant to the Chief Operating Superintendent, and Head of the Traffic Planning Section, North Eastern Region Headquarters, York.

Mr. W. O. Gay, Chief of Police, North Eastern Area, York, British Transport Commission, who as recorded in our March 27 issue, has been appointed Chief of Police (Crime), Euston, joined the Great Western Railway Police at Paddington, in 1936. He



Mr. W. O. Gay

Appointed Chief of Police (Crime)  
British Transport Commission



Mr. F. C. Brashier

Appointed Chief of Police, N. E. Area,  
British Transport Commission



Mr. J. Lawrence

Appointed Chief of Police, Southern Area  
British Transport Commission

[Elliot & Fry

served in South Wales, was appointed Detective Sergeant, in 1938, and shortly afterwards took up special war duties at Headquarters. In 1946 he went to Birmingham, as Detective Chief Inspector, Northern Division, G.W.R. Police, and in 1949, when the Railway Police were re-organised as the B.T.C. Police, Mr. Gay became Chief Inspector of the Special Branch attached to the Midland Area. In 1950 he was appointed Assistant Chief of Police, Eastern Area, and in 1951 Chief of Police. In 1956 he became Chief of Police, Northern Area, York, the position he now vacates. For many years Mr. Gay has maintained close relations with railway and other police officers on the Continent and in the Commonwealth, and in 1954 he gave a lecture at Utrecht, in Dutch, on The British Railways Police, the meeting being attended by the Netherlands Railways Police Force.

Mr. E. C. Brashier, Assistant Chief of Police, Windsor, Western Police Area, British Transport Commission, who as recorded in our April 17 issue has been appointed Chief of Police, North Eastern Police Area, joined the Southern Railway Police in 1924. Mr. Brashier was promoted to be Sergeant in 1929, Detective Sergeant in 1931, Detective Inspector in 1940, and Superintendent in 1944. He has controlled both Passenger and Goods Divisions and has worked in close liaison with the Port Authorities, including Marine, Home Office and Special Branch Services, at Dover, Folkestone and Newhaven. As a Superintendent he has been in charge of Divisions at Bricklayers Arms, Waterloo (including Victoria), Liverpool St. and Paddington (including Euston). He has also worked in close conjunction with the British Transport Docks Divisions at Southampton and in South Wales. In 1952 Mr. Brashier was appointed Assistant Chief of Police, South Western Police Area, covering Southern and Western Regions, but in 1958, he became Assistant Chief of Police of the Western Police Area. He has always taken an interest in the Ambulance Movement as well as in social and athletic activities.

Mr. J. Lawrence, Q.P.M., Chief Constable, Reading Borough Police, who, as recorded in our March 27 issue has been appointed Chief of Police, Southern Area, British Transport Commission, was born in Amesbury and educated at Bishop Wordsworth School, Salisbury. He joined the Reading Borough Police Force as a constable, in 1928, and was transferred to the Criminal Investigation Department in 1931. He was promoted to be Detective Sergeant in 1937, after successfully completing the Special Detective's Course at Hendon Police College. In 1945 he was appointed Detective Inspector, and, in 1946, Chief Inspector, and later Superintendent. He became Deputy Chief Constable in 1947, and Chief Constable in 1948. Mr. Lawrence was awarded the Queen's Police Medal in 1953 for distinguished services.

Mr. G. S. Orr has been appointed Manager, Scottish Division, Mobil Oil Co. Ltd. He succeeds Mr. A. Todd, who is on retirement leave.

Mr. J. B. Fender, Docks Accountant, Middlesbrough & Hartlepools, British Transport Docks Division, has been appointed Treasurer, North Eastern Region, British Railways.

Mr. Ernest K. Bloss, General Mechanical Superintendent, Boston & Marine Railroad, has been appointed Director of Research & Development. Mr. John E. Rourke, General Superintendent Transportation, has been appointed Assistant Director of Research & Development.

Mr. K. W. C. Grand, Member of the British Transport Commission, has been appointed a member of the Industrial Coal Consumers' Council.

Mr. R. I. Douglas, Railway Sales Engineer of Permal Limited, is leaving the United Kingdom on May 11 to visit Scandinavian railway administrations and manufacturers. He will be away for a month.

Mr. T. W. Greenwood, Managing Director of Philiplug Limited, leaves on May 2 for an extensive business tour of Canada and the U.S.A.

Mr. G. Arnold Hart has been appointed a director of the Canadian Pacific Railway Company to fill the vacancy created by the death of Mr. Gordon R. Ball. Mr. Hart is President & Chief Executive Officer of the Bank of Montreal.

Mr. J. S. Tritton, President of the International Federation of Consulting Engineers (F.I.D.I.C.), is making a tour of the U.S.A. and Canada. He is addressing the Consulting Engineers' Council of America, at a banquet in New York on May 1.

Mr. A. H. Hird, has been appointed to the board of English Steel Corporation Limited. He is a director of Vickers Limited, and a number of subsidiary companies, and has many past associations with English Steel Corporation Limited.

Mr. H. A. Rich has been appointed Division Manager of the newly-created North Western Retail Division, Mobil Oil Co. Ltd. Mr. C. B. Cotterell succeeds Mr. W. J. Frier, who is to retire shortly, as Division Manager, Northern Retail Division.

Mr. C. W. Hayward, Chairman of Firth Cleveland Limited, has been appointed Chairman of the Sheffield Wire Rope Co. Ltd. Other directors will be Mr. E. S. Mead, Mr. R. S. H. Shepard, Mr. G. F. Chambers, Mr. S. K. Wheatley, Mr. H. V. W. Buckler and Mr. B. Allen. The Sheffield Wire Rope Co. Ltd., has recently been acquired by the Firth Cleveland Group.

Mr. G. S. Steven, Managing Director of Allied Ironfounders Limited, has been elected Vice-Chairman. Mr. H. C. Wilson Bennett has been appointed Managing Director jointly with Mr. Steven. Mr. G. F. Williams and Mr. C. W. Ferguson, who have been associated with the Coalbrookdale Co. Ltd., the Durban Falkirk Iron Co. Pty. respectively for many years have been appointed directors of Allied Ironfounders Limited.

Mr. D. M. Boyd, a director of Fisons Limited, has been elected Chairman of the Association of Chemical & Allied Employers. He succeeds Sir Laurence Merriam, who retires after a two-year term of office. Mr. Boyd has also been elected vice-chairman of the Chemical & Allied Industries Joint Industrial Council. He has relinquished his duties as Production Director, Fertiliser Division, Fisons Limited, to devote himself fully to the new appointment. He will remain a member of the Fertiliser Division board and continue as a director on the main Board of Fisons Limited.

#### B.R.S. APPOINTMENTS

The following appointments are announced by British Road Services :

Mr. A. F. Walton, Operations Manager (Parcels), Headquarters, as Area Manager, London Parcels Area, with effect from May 18, on the retirement of Mr. R. W. Mitchell.

Mr. N. J. Kevan, Planning Officer (Parcels), Headquarters, as Operations Officer (Parcels), Headquarters.

Sir Ewart Smith, Deputy Chairman, Imperial Chemical Industries, has retired.

Mr. R. G. Johnston, Freight Traffic Manager, Canadian National Railways, has been appointed head of the newly-formed Department of Merchandise Services. Mr. Johnston joined the C.N.R. in 1929 and was appointed Research Assistant in 1946. The following year he moved to Toronto as Assistant Transport Economist. He became Transport Economist, Montreal, in 1950, and was appointed Chief of Transport Research in 1953. He was made Traffic Research Officer, Traffic Department, in 1955, and in 1956 was appointed Freight Traffic Manager.

#### THE INSTITUTION OF LOCOMOTIVE ENGINEERS

The following names have been entered on, or transferred in, the register of members of the Institution of Locomotive Engineers:—

*Member*  
Mr. W. J. A. Sykes, Chief Mechanical & Electrical Engineer, London Bridge, Southern Region, British Railways.

*Associate Members*  
Mr. W. A. Clegg, Assistant Motive Power Superintendent, Bulawayo, Rhodesian Railways.

Mr. G. S. Cusick, Chief Draughtsman, Beyer Peacock & Co. Ltd.

Mr. S. G. Dale, Electrical Engineer English Electric Co. Ltd.

Mr. A. J. Macleod, Technical Assistant (Rail Traction), Esso Petroleum Co. Ltd.

Mr. F. Soar, Shedmaster, Nairobi, East African Railways & Harbours.

Mr. T. H. L. Wild, Technical Assistant, Chief Mechanical & Electrical Engineer's Department, London Bridge, Southern Region, British Railways.

*Associates*  
Mr. A. J. Gibson, Manager, Railway Sales Department, G. Spencer Moulton & Co. Ltd.

Mr. P. G. Thomson, Joint Managing Director, J. Stone & Co. (Deptford) Ltd.

*Graduates*  
Mr. P. K. Banerjee, Apprentice, W. G. Bagnall Limited.

Mr. P. C. H. Birch, Graduate Apprentice, English Electric Co. Ltd.

Mr. G. W. J. Brecknell, Engineering Graduate, Swindon, Western Region, British Railways.

Mr. B. T. Chadwick, Graduate Apprentice, English Electric Co. Ltd.

Mr. P. Chowdhuri, Junior Engineer, Traction Machines Department, General Electric Co. Ltd.

Mr. G. E. Clarke, Graduate Apprentice, Traction, English Electric Co. Ltd.

Mr. F. Fort, Technician, Production Planning, Locomotive Works, Horwich, British Railways.

Mr. R. F. Hill, Senior Draughtsman, Chief Mechanical & Electrical Engineer's Department, Carriage & Wagon Drawing Office, Derby, British Railways.

Mr. M. Howarth, Trainee Draughtsman, Locomotive Works, Horwich, British Railways.

Mr. B. Pearce, Electrical Assistant, Outdoor Machinery Dept., Swindon, British Railways.

Mr. G. P. Quayle, Graduate Apprentice, English Electric Co. Ltd.

Mr. G. A. Smith, Junior Engineer, Traction Control Engineering Dept., Metropolitan-Vickers Elect. Co. Ltd.

#### *Student*

Mr. J. J. Baxendale, Student Engineer, Locomotive Works, Horwich, British Railways.

#### *Transfer Graduate to Associate Member*

Mr. M. J. Atkinson, Diesel Assistant to Line Traffic Officer, Crewe, London Midland Region, British Railways.

## NEW EQUIPMENT AND PROCESSES



### DYNAMIC BALANCING OF INJECTORS AND FAULT LOCATION

A SYSTEM has been developed for the dynamic balancing of injectors to the fuel pump of diesel engines and for the accurate location of faults in the fuel system.

The equipment consists of a set of portable instruments designed for use while the engine is running, thus enabling correct balance of the fuel system to be obtained under true operating conditions. Consequent advantages are: increased b.h.p., reduced fuel consumption, low maintenance costs, and smoke reduction.

The equipment includes two new instruments. These are, respectively, the Diesindicator (illustrated on this page), and the Diestimer.

The Diesindicator is easily and quickly fitted, virtually maintenance-free, and can be operated horizontally or vertically. It gives indication of peak pressure. The Diestimer facilitates accurate setting and checking of fuel-pump timing.

These two instruments combine with the manufacturer's existing Injectester and Injectometer to provide a complete system for diagnosing injection, fuel pump, and

compression faults under operating conditions. Further details can be obtained from the Dunedin Engineering Co. Ltd. at that company's new premises at 73-75, Mortimer Street, London, W.1.

### VOLTAGE CONTROLLER

THE Bryans voltage controller has been designed as a compact and portable instrument providing an output voltage variable from 0 to 270-V. a.c. from a 230-V. 50-cycle supply.

The unit consists of a continuously-variable transformer the output of which is shown on a high-grade voltmeter and which incorporates fuse-fitted input and output circuits, a pilot lamp, and on/off switch. Input is by 6-in. flexible mains lead. Output may be taken from a three-pin 5-A. socket or a pair of insulated terminals. Accuracy is 2 per cent F.S.D.

Overall dimensions of the controller are 10½ in. x 6 in. x 5 in. Weight is approximately 101 lb.

Further details can be obtained from Bryans Aeroquipment Limited, 1, Willow Lane, Mitcham, Surrey.

### SIGNAL SOURCE

THE Bryans d.c. signal source is a portable item of equipment providing a signal of variable magnitude. It is suitable for testing amplifiers, transistors, and relay operating current measurement.

The unit gives a zero to 50-V. d.c. supply for use as voltage or current source. As a voltage source, supply is metered with a zero to 50 micro-A. meter used as a voltmeter. Metered output then is fed to an attenuator giving eight ranges of voltage. As a current source, the supply is fed to output terminals via the meter. The range switch shunts the meter and introduces a suitable limiting resistance in the output to prevent damage to the meter on each of the current ranges.

A reversing switch permits polarity to be reversed without disconnection of leads. Consumption on 190-250-V. 50-cycle mains supply is about 15 W. Dimensions are 10½ in. x 6 in. x 5 in. Weight is 6 lb.

Further details can be obtained from Bryans Aeroquipment Limited, 1 Willow Lane, Mitcham, Surrey.



### ELECTRIC HOIST BLOCK

A TOTALLY enclosed 1-ton capacity wire rope electric hoist block is available which incorporates many features of interest to operators and maintenance men. Ball bearings are used throughout. All electrical and mechanical equipment is freely accessible.

Three different speeds are available and a two-speed version incorporating a slow hoisting speed for special jobs also can be supplied.

The block also is available for fixed suspension, push travel, hand-gear travel, or motor travel.

Further details can be obtained from the Paterson Hughes Engineering Co. Ltd., Bedford House, Bedford Street, Strand, London, W.C.2.

### LIQUID SURFACE COATING

READY-TO-USE Liquid "Exolit" Firestop is a new version of the manufacturer's existing product. It is claimed to be as easy to use as paint. It will prevent flame spread and delay a "flash-over" on combustible materials such as fibre board, timber, acoustic board, and hardboard. It



has been officially tested by the Joint Fire Research Organisation to provide Class 1 of B.S. 476 surface spread of flame rating (surfaces with very low flamespread). It is especially suitable for use during re-painting, as it combines a decorative medium with the maximum protection against flame spread. It complies in full with all requirements of the Thermal Insulation (Industrial Buildings) Act, 1957.

Further details can be obtained from Exsud Engineering Limited, Home Industrial Division, 26-27, Cowcross Street, London, E.C.1.

### Portable Cable Test Set

THE Calidec MB cable test set (Patent applied for) is a portable battery-operated instrument for continuity-testing all types of wiring installations for earth leaks up to 3 meg. ohms. Indications are given audibly and visually and tests are carried out simultaneously.

The highest possible voltage at the highest ohmic value leak is ensured by the application of 90V. to the circuit, which uses a thermionic valve and two high-resistance relays. Warming-up time is under three sec. Batteries used are obtainable at any radio shop and easily replaced.

Operation is simple and can be carried out with one hand. Skilled labour is not required. Two test buttons are provided in the front panel of the instrument. Special models can be supplied to indicate a leak up to 10 megs.

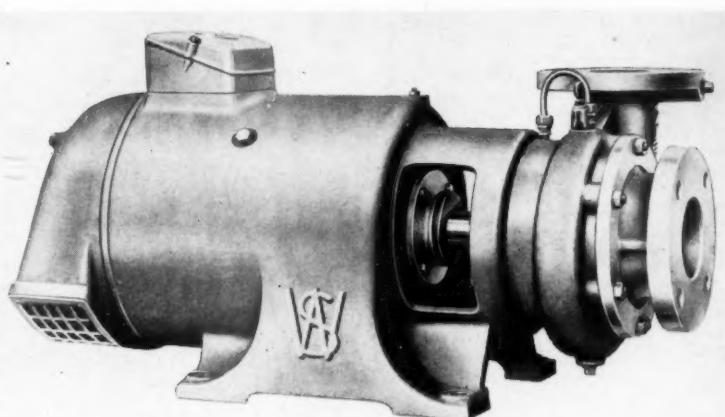
Overall dimensions are as follow: length—10½ in., width—6½ in., height—7½ in. Weight with batteries—9 lb.

Further details can be obtained from Calidec Limited, 12-15, Lupin Street, Birmingham, 7.

### Innovation on Hobbing Machine

A NEW development on the Dowding V.4 hobbing machine is the incorporation of a cam-operated automatic plunge feed providing fast approach and automatic return of the work table for loading and unloading. The feature also allows precise control to be kept of the depth of cut for repetition production of worm wheels and spurs of narrow face width. It can be fitted to any V.4 machine.

Further details, including a new brochure on the V.4, can be obtained from Dowding &



Doll Limited, 340, Kensington High Street, London, W.14.

### Improved Pumps

CLASS "E" insulated motor windings have been introduced to the smaller and lighter models in the 1½-10 h.p. range of "Monobloc" range of pumps. Performances are claimed to match those of comparable units fitted with Class "A" motors.

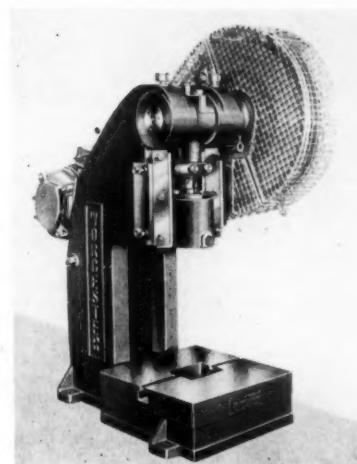
The 5 h.p. motor is fitted to a two-stage "Vortex" pump with maximum capacity of 520 gal. per hr. and maximum head of 540 ft. depending on capacity. Dimensions are: 2 ft. 1 in. x 9 in. x 1 ft. 2 in. Weight is 175 lb. Dimensions of the same pump end fitted with a 5 h.p. Class "A" motor are: 2 ft. 0½ in. x 11 in. x 1 ft. 2½ in. Weight is 216 lb.

Further details can be obtained from the manufacturer, Worthington-Simpson Limited, Queens House, Kingsway, London, W.C.2.

### Bench Power Press

THE Worcester range of bench power presses has been augmented by a large daylight, deep-throated model of 6-ton capacity.

It has an open height of 12½ in.



and throat depth (centre-to-back) of 7 in. Bed is 13 in. square; overall height, 39 in.; base (left to right), 16 in. (front to back), 22 in.

Drive is by twin Vee-belts from a 1 h.p. motor, giving a flywheel speed of 180 r.p.m. Fixed strokes of 1¼ in., ¾ in., or ½ in. are available, and ram adjustment is 1¼ in. All moving parts are interchangeable with the standard 6-ton Worcester press.

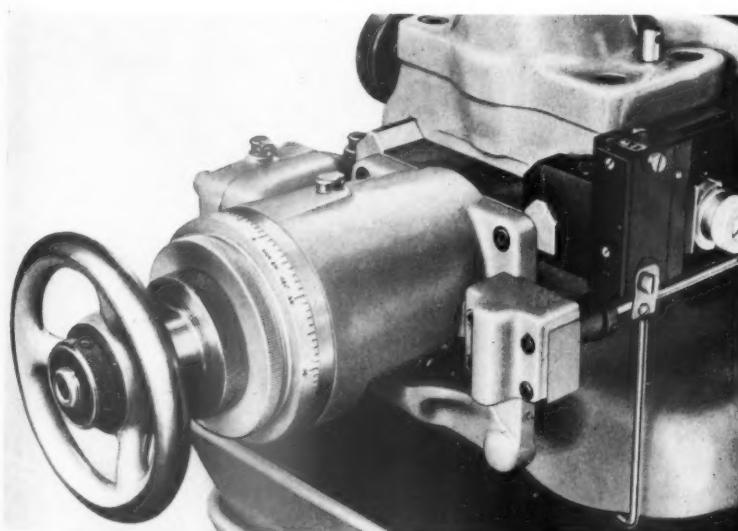
Optional extras include single-stroking clutch, floor stand, and keywaged crank-shaft extension piece for automatic feed drive.

Further details can be obtained from Jones & Attwood Limited, Stourbridge.

### New Filter Design

YET another design of Auto-Klean self-cleaning filters for liquids is available. Similar in outward appearance to that illustrated in our January 23 issue, and suitable for use on diesel and oil-fired locomotives, it incorporates a self-cleaning filter-plate pack and paper filter element. This combination is claimed to prevent build-up of ultra-fine particles in the low-micron range. A magnetic unit is incorporated to give added protection. Liquid entering the filter is directed into two channels; the greater part passes through the plate element and a smaller volume through the paper element. A turbulence baffle eliminates any disturbance of collected solids.

Further details can be obtained from the manufacturer, Auto-Klean Strainers Limited, Lascars Works, Hounslow, Middlesex.





### Mobile Cleansing Unit

THE 2033ES is a new high-pressure under-frame cleansing unit which, apart from requiring an electric power supply, is completely self-contained, as it is independent of external air and water supplies.

The unit comprises a 6-gal. container for detergent mixture and a 14-gal. container for water. The detergent mixture is applied under pressure through a 40-ft. length of  $\frac{1}{2}$ -in. hose; the water, also under pressure, then is used to wash off. The same hose is used for both liquids, selection being made by manually-operated valves.

Pressurisation is by a 5-cu. ft. single-stage compressor driven by a  $\frac{1}{2}$ -h.p. electric motor. This can be supplied at standard voltages for single- or three-phase supply or for 50V. single-phase supply. The electric motor and starter switch are to British Railways specification. A 50-ft. length of supply lead is provided.

The unit is mounted on two rubber-tyre 12-in. wheels and a 6-in. Revvo castor. Overall dimensions are as follow: height—3 ft. 9 $\frac{1}{2}$  in.; length—4 ft. 6 in.; width—

2 ft. 3 in. Price (for 230V. single-phase model) is £227 10s.

Further details can be obtained from C. C. Wakefield & Co. Ltd., 46, Grosvenor Street, London, W.1.

### Integral Diesel-Compressors

**DIESEL-COMPRESSOR** sets of integral construction, with the diesel cylinder horizontal and the air cylinder vertical as part of the same framing, are made in two types—one a mobile unit for civil engineering works and the like, and the second a stationary model. The latter construction is becoming popular for diesel locomotives as a brake and general air set when a belt or shaft drive off the main engine is not desired.

The four-stroke engine cylinder is of 125 mm. bore and 145 mm. stroke, and output is 20 b.h.p. at top speed of 1,500 r.p.m. The air cylinder is of 135 mm. bore and 140 mm. stroke, with connecting rod coupled direct to the diesel connecting rod; the whole arrangement gives good mass balance and vibration-free running. Diesel and air cylinders are water-cooled by the same system.

At 1,500 r.p.m. the effective suction capacity of the compressor is 2.2 cu. m. (78 cu. ft.) of air per min., with a final pressure of 6 atm. (86 lb. per sq. in.), or 2.1 cu. m. (72 cu. ft.) with a final pressure of 7 atm. (100 lb. per sq. in.). Speed of a set can be regulated to any speed between 1,000 r.p.m. and 1,500 r.p.m.

A complete set includes radiator, water-cooling pump, oil-bath cleaner for engine and compressor, air, silencer, fuel tank, air valves and gauges, and a 98-litre (3.5 cu. ft.) air reservoir, though in the stationary set the reservoir can be mounted elsewhere if desired.

The portable unit is carried on a two-wheel chassis, and its power unit is enclosed in a sheet-steel casing. The fuel tank forms the chassis on which the compressor is saddle mounted, with the control unit fitted vertically at one end, and the air receiver over the castor wheel.

Further particulars can be obtained from the Jenbacher-Werke, Jenbach i. Tirol, Austria.

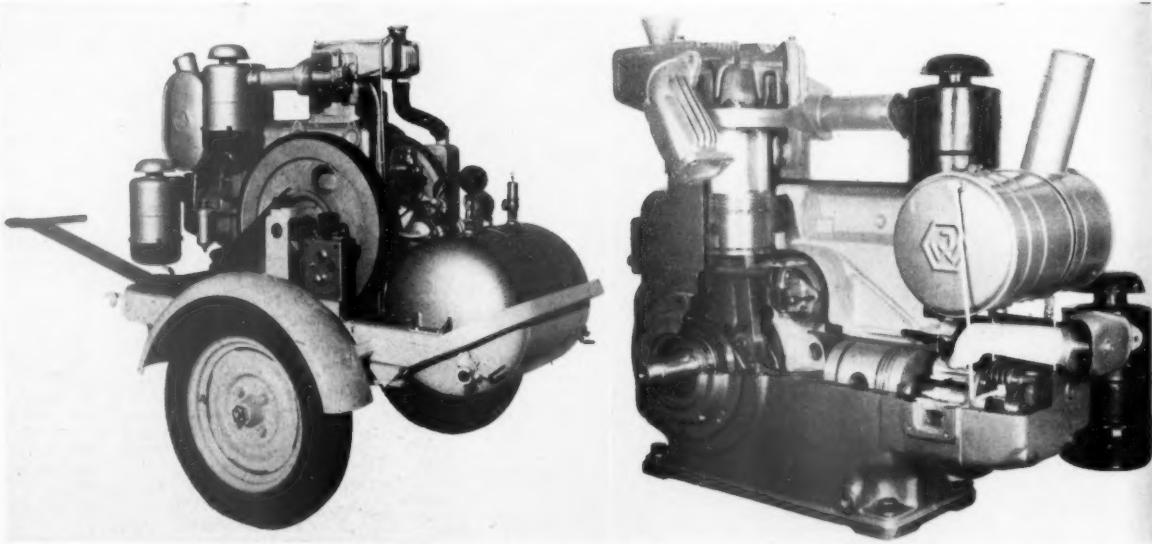
### Accelerator Pump

**A**N addition to the Safran range of pumps, the Safrax circulator is a compact, silent-running, glandless unit which is stated to maintain efficient circulation through small-bore central heating systems.

The circulator can be fitted at any angle to the piping provided that the motor is horizontal; sleeve bearings are water-lubricated. A fitting in the nose of the unit can be used to check rotation at installation or to turn the motor after it has been standing idle to ensure free running. Motor windings will withstand arduous conditions, it is claimed, and a single switch is normally sufficient for control. The whole motor stator can be removed for inspection without disturbing the pipeline or draining the system.

Suitable for 230-250 V. single-phase 50 cycle a.c. supplies, the motor is of  $\frac{1}{2}$  h.p. and operates at 1,350 r.p.m. Shaft and rotor shield are of stainless steel and the impeller is of bronze. Branch sizes are  $\frac{3}{4}$  in. or 1 in.

The price quoted is £30 15s and delivery from stock. Further details can be obtained from the manufacturer of the equipment, Saunders Valve Co. Ltd., Drayton Street, Wolverhampton.



## Aluminium and Railway Rolling Stock

### Research and development at the British Aluminium research laboratories

Although the welding of aluminium and its alloys by various techniques has been known and used on an increasing scale during the past decade in the workshops of railway authorities and rolling stock contractors, this process has been delayed in reaching maturity because of a number of difficulties. One of the principal obstacles to be overcome was the welding of relatively thin panels and extruded sections whilst the others included the automation of welding equipment to obtain aluminium-alloy structures fabricated from sheet and plate, and small and large extrusions as an economic proposition. The former case is specifically encountered in the construction of bodies for locomotives, coaches, covered wagons, containers, and so forth, whilst the latter is found in all rolling stock structures.

The British Aluminium Co. Ltd. appreciated that these difficulties would be encountered in due course during the development of the application of the welding techniques and several years ago initiated investigations into these subjects, together with a research programme on the mechanical properties, including fatigue, of joints welded in these circumstances. This was undertaken to obtain general information applicable to all fields of engineering; on completion, it was considered that the results would be very useful in the construction of aluminium alloy rolling stock and it was decided to invite engineers from the British Transport Commission and industry to review this equipment and information in the research laboratories at Chalfont Park, Buckinghamshire.

#### Gun Feed Pulls Electrode

During these visits to the laboratories which took place on April 14, 15, and 16, the principal exhibit was a new type of welding gun incorporating, in addition to the contemporary argon gas nozzle and electrical connections, a reel of alloy wire to provide the consumable electrode and a fractional horsepower motor for the feed drive, thus pulling the electrode through the gun in place of the normal push feed; the reel is mounted on the top of the gun and the motor in the handle. This process enables the minimum parent material thickness which may be satisfactorily welded to be reduced from  $\frac{1}{16}$  in. for general practice or  $\frac{1}{8}$  in. for highly skilled welders to 16 s.w.g. or thinner material for special purposes.

A number of demonstrations was carried out during the visits. The welding gun used for these tests was of an experimental type, devised and manufactured by the research staff of the British Aluminium Co. Ltd. Commercial equipment of this type is being manufactured by an independent company in the United Kingdom, under licence from the U.S.A. and will be available towards the beginning of next month.

#### Automatic Processes

The primary equipment derived from the programme of research and development on automatic processes will be that in which a contemporary consumable electrode, argon gas welding head is mounted on a self-guiding trolley, this being attained by roller guides in the edge preparation contour or castors on the parent plate or member. This will enable satisfactory and consistent welding to be carried out both of continuous and intermittent type and will be most suitable for welding plates and extrusions in the construction of most rolling stock bodies and large size tanks for wagons.

In addition to normal mechanical and

fatigue testing equipment, other special facilities were discussed with the visitors. One of these was the dynamic strain-gauging recorder which can be connected to 24 gauges on the test specimen and may record the stress levels at any group of six of these gauges due to dynamic loading conditions. This equipment was recently used when a London Transport Executive motor bogie was tested under service conditions by London Transport Executive and British Aluminium Co. Ltd. staff for information required by the Aluminium Development Association. Photographs of these tests were on exhibition.

Another set of photographs on show indicated the lightweight trailer cars being constructed by the Malayan Railway Authorities in their workshops at Kuala Lumpur, Malaya. These cars incorporate a body constructed entirely from aluminium-alloy extrusions and which does not involve any exterior paneling, the purpose being to provide a fluted and corrugated exterior as on the diesel railcars with which they will operate. The aluminium body is entirely of welded construction.

Among those who visited the laboratories were:

Messrs. L. B. Banks, Assistant Superintendent, Engineering Division, Research Department, British Transport Commission; J. L. Barnes, Director & Chief Engineer, Metropolitan Cammell Carriage & Wagon Co. Ltd.; A. E. Bates, Carriage & Wagon

Works Superintendent, British Railways, London Midland Region; O. V. S. Bulleid; E. S. Cox, Assistant Chief Mechanical Engineer, British Transport Commission; A. Campbell, Consultant, and S. E. Coppen, Senior Engineer, Crown Agents for Oversea Governments & Administrations; F. Dickson, Chief Draughtsman (Railway), London Transport Executive; H. Garcia, Works Manager, G. R. Turner, Limited; R. G. Hooker, Director & General Manager, Brush Electrical Engineering Co. Ltd.; B. G. Illingworth, Assistant Director of Engineering, English Electric Co. Ltd.; T. E. M. Jones, Chief Metallurgist, Head Wrightson (Teesdale) Co. Ltd.;

W. H. Maass, Advisory Engineer to the High Commissioner for the Union of South Africa; A. W. Manser, Chief Mechanical Engineer (Railways), London Transport Executive; J. C. Primmer, General Manager, G. R. Turner Limited; H. J. Ridout, Chief Carriage & Wagon Draughtsman, and S. Ridgway, Senior Production Assistant, British Railways, Western Region;

C. A. Shepherd, Assistant Carriage & Wagon Engineer, British Railways, Southern Region; J. A. Sims, Chief Engineer, Railway Division, Pressed Steel Co. Ltd.; F. W. Sinclair, Chief Designer, Gloucester Railway Carriage & Wagon Co. Ltd.; P. Spear, Director of Research, Rubery Owen & Co., Ltd.;

G. H. Taylor, Carriage & Wagon Engineer, British Railways, Eastern & North Eastern Regions; Dr. Tull, Mechanical Engineering Experimental Establishment, Ministry of Supply; Messrs. R. H. S. Turner, Director & Works Manager, Metropolitan-Vickers Electrical Co. Ltd.; G. Walton, Technical Assistant, British Railways, London Midland Region; G. Williams, London Manager, Pressed Steel Co. Ltd.

## Telecommunications Developments at Crewe

### Installation of 600 line telephone exchange for L.M. Region

As reported in our issue of April 10, 1959, British Railways, London Midland Region, railway telephone exchange was put into service on April 13, in the former Staff Hostel adjacent to the Crewe Arms Hotel. It replaces the former exchange above No. 5 platform at Crewe Station.

Associated with the new automatic exchange is an eight-position manual switchboard for handling trunk telephone traffic. The building has been so designed that all operating staff will be accommodated on the first floor. The switching and transmission equipment along with the engineering staff is accommodated on the ground floor. Central heating of the whole of the building is provided by automatically regulated gas-fired boilers. Forced ventilation by air ducts to the main equipment rooms prevents the ingress of dust.

#### Four-Digit Numbering

The provision of the new exchange has involved the renumbering of all telephone extensions also using a four-digit numbering scheme in place of the present three-digit in preparation for the gradual introduction of trunk dialling. Additional facilities include direct access to the Post Office network by selected extensions, thus enabling local Post Office calls to be made without the intervention of the railway operators.

An enquiry facility is also available to certain extensions whereby, on pressing a hold button on the telephone instrument, an incoming call may be held whilst the same telephone is used to call another extension to seek the information required. On pressing the hold button a second time, the original caller is reconnected. Emergency

calls from any extension for such services as fire, police or ambulance may be made by dialling the digits "999" over a private emergency system thus supplementing the existing arrangements already in operation for these services.

The exchange supervisor is accommodated at a desk position in the manual switchboard room, the desk being specially equipped to enable the various routine trunk conference networks, required at pre-determined times throughout each day, to be established. The supervisor is also able to monitor any call, including emergency calls, passing through the switchboard.

The telephone exchange and its associated equipment was supplied and installed by the General Electric Co. Ltd., of Coventry to a specification prepared by Mr. E. G. Brentnall, Signal Engineer, London Midland Region. The commissioning of the new exchange is being followed by the installation of six 12-circuit carrier telephone terminals to provide additional trunk lines to Derby, Manchester, and Liverpool for both administrative and traffic control purposes. Certain channels will be reserved for use in connection with multi-channel telegraph systems which will form the basis of an extended teleprinter network.

#### Telegraph Operating Room

Accommodation has been provided in the telecommunications building for a new telegraph operating room and for automatic teleprinter switching plant, for which it is proposed to use electronic switching devices. The switching equipment will have an ultimate capacity of 125 teleprinter lines of which 75 will be initially equipped. Routing

of messages through the switching centre will be effected by coded addresses typed by the teletypewriter operator at the originating office and special provision will be made for the handling of multiple address messages, and overflow traffic. Serial numbers will be automatically inserted in all through messages and special equipment provided to permit the supervisor to check traffic and assume control in any emergency.

#### Connection with Other Regions

Other switching centres at the main centres of communication on the London Midland Region are envisaged at a later date with full inter-connection with other Regions as the ultimate aim, but these developments will be dependent upon the provision of adequate line plant as the modernisation plan proceeds.

### L.T.E. Tests with Load Measuring Baseplates

The London Transport Executive has recently carried out a series of tests to determine the vertical impact forces imposed by the wheels of Underground trains on the rails at rail joints and to discover the effect of this impact on nose-suspended traction motors with various types of bogie and motor suspensions. The tests were initiated to determine what advantages, both as to track maintenance and traction motor maintenance, would derive from providing a degree of resilience in the traction motor mountings, but the scope was widened in the course of the work.

#### Various Types of Track

Tests were made on both ballasted and solid track formation and with bull-head and flat-bottom rails. Suitable lengths of new 95-lb. B.H. and new 98-lb. F.B. rails were laid in the westbound fast road at South Ealing, District and Piccadilly lines, where the track is ballasted, and also in the westbound Piccadilly track at King's Cross, where the formation is of concrete.

#### Recording Equipment

Sections of the new running rails on both sides of selected rail joints were mounted on load measuring baseplates fitted with strain gauges, the signals from which were picked up by a multi-channel recorder at the side of the track. In addition, accelerometers were fitted under traction motor cases on the rolling stock, signals being fed to a cathode ray oscilloscope and camera on the train.

#### Types of Tube Stock

Tests at South Ealing were made with three types of tube stock having respectively rubber axlebox and bogie bolster suspension, and solid or semi-resilient motor suspension. The same tube stock was used for the tests at King's Cross. At South Ealing, tests were made also with three types of surface stock. Readings were taken as the trains ran over the test lengths of track at speeds up to 50 m.p.h. Communication between personnel on the trains and at the trackside was by radio-telephony. The results of the analysis of the test readings will not be available for some time.

The effects on the track were measured for Mr. C. E. Dunton, Chief Civil Engineer, and the effects on the motors for Mr. A. W. Marples, Chief Mechanical Engineer (Railways), London Transport. The tests were carried out in conjunction with the British Railways' Research Department at Derby.

### Parliamentary Notes

#### Closing of Branch Lines in Wales

Mr. Roderic Bowen (Cardigan—Lib.), in the debate on Welsh affairs on April 23, said that an added complication in the struggle to obtain light industries was the fact that there were strong rumours that a number of railway services were either to be reduced or abolished altogether. For example, there were disturbing rumours that the Aberystwyth-Carmarthen service was to be reduced, and that the Whitland-Cardigan line was to be closed and further limitations placed on the Aberystwyth-Shrewsbury line.

#### Roads Alongside Railways in the Colonies

Lord Ferrier, in the Second Reading debate on the Colonial Development & Welfare (Amendment) Bill in the House of Lords on April 21, said that administrators were sometimes hesitant to encourage the building of a road where that road was going to compete with a railway track and affect the revenue return from the railway.

"My own opinion, based on experience," added Lord Ferrier, "is that that is a very short-sighted view, and that even the superimposing of a road track on a railway bridge will pay the countryside and pay the railway in the end, although at first sight it looks like inviting competition."

### Questions in Parliament

#### New Chairman of L.T.E.

Mr. Ernest Davies (Enfield E.—Lab.) asked the Minister of Transport & Civil Aviation, on April 24 whether he could now make a statement on the Chairmanship of the London Transport Executive.

Mr. Harold Watkinson, in a written answer: I have decided, after consultation with the Chairman of the British Transport Commission, to appoint Mr. A. B. B. Valentine to be Chairman of L.T.E. in succession to Sir John Elliot, who is retiring on June 30. I should like to take this opportunity of paying a tribute to the great service that Sir John Elliot has rendered as Chairman of L.T.E. for nearly six years. The new Chairman will bring to bear on the problems that face him an outstanding knowledge derived from many years of experience of London Transport. I am sure we all wish him well in his most responsible task.

#### Safety of Mails Carried by Railways

Mr. Peter Remnant (Wokingham—C.) asked the Postmaster General on April 22 what steps he took to safeguard the mails while being carried by British Railways.

Mr. Ernest Marples: To give details of the precautions taken for the safety of mails would be of great interest to thieves. We are constantly reviewing and adapting our security arrangements with a view to deterring and catching the thieves. The number of mail bags lost is today very much less than it was some years ago.

Mr. Remnant: Is the Postmaster General aware of the anxiety and apprehension felt by the public at these continual robberies, and does his assurance, which I take to refer to traffic being conveyed over the railways, apply to other spheres of his activities?

Mr. Marples: It applies to all spheres. Losses to date have been less than they have been for a considerable time. This year, mailbag losses are only 55 per cent of what they were in 1951-52 and in 1952-53.

#### Gateshead Locomotive Works

Mr. H. E. Randall (Gateshead W.—Lab.) asked the Minister of Labour on April 22 what was the number of men declared redundant on the closing of the Gateshead

Locomotive Works: how many were still unemployed; and what steps were being taken to find them other employment.

Mr. Iain Macleod: 41 men were discharged when the works closed in March and 10 of them remain unemployed. My local officers are making every effort to place them in suitable jobs.

### Staff and Labour Matters

The A.E.U. National Committee in conference at Eastbourne on April 28, whilst supporting the claim of a 40-hour week and giving the Union leaders instructions for direct action to enforce it if it is rejected again, turned down a plea from the President of the A.E.U. that it should be given priority. The line taken was that the Union could not forgo a pay claim this year in preference to concentrating on the shorter working week.

The pay claim will come up for discussion later in the week, when it is expected a demand will be made for an increase of 15 per cent in rates of pay. A resolution proposing an overtime ban and a one-day strike in support of shorter hours was defeated.

#### Railway Workshop Staff

The question of redundancy of Railway Workshop Staff was discussed at a meeting of the Railway Shopmen's National Council on April 30, when it was expected that an agreement would be reached, details of which will be published in our next issue.

### L.T.E. Chairmanship

Sir John Elliot, present Chairman of the London Transport Executive, who is retiring on June 30, has made the following comment on the appointment of Mr. A. B. B. Valentine as his successor as Chairman, and on that of Mr. A. H. Grainger as Managing Director: "These are fine appointments—the combination of my old friend Alec Valentine, a product of London Transport and past President of the Institute of Transport, and Arthur Grainger, my Deputy Chairman, who is now also to be Managing Director, will ensure that London Transport will have the strongest and most experienced leadership possible in the testing times ahead. Londoners can feel that their travel problems will be in good hands."

#### BRITISH STANDARD FOR POWER TRANSFORMERS.

—A British Standard, B.S.171: 1959, power transformers, is a revised edition of B.S.171: 1936, electrical performance of transformers for power and lighting. It includes a revision of B.S. 422: 1931, Transformer inter-turn insulation, which is no longer available as a separate publication. The standard applies to power transformers, reactors and earthing transformers having windings insulated with Class A, B or C materials, with single-phase ratings of 1 kVA. and above or polyphase ratings of 2 kVA. and above. Transformers for all voltages and the service conditions for which they are suitable are dealt with. Both dry-type and oil-immersed types are specified. A complete section is devoted to insulation levels. Full details of the routine tests necessary to prove the performance of the transformer are included and the method by which efficiencies and losses are to be stated is laid down. Tests of impulse-voltage withstand temperature rise and the measurement of zero phase-sequence impedance also are included. Copies, price 20s, may be obtained from the British Standards Institution, 2, Park Street, London, W.1.

## Contracts and Tenders

### Japanese rolling stock for the Sudan

Further details have been received regarding the order received by the Fuji Car Manufacturing Co. Ltd., Osaka, Japan, from the Sudan Railways for tank wagons, reported in our issue of April 10, 1959. The order covers 25 13,400-gal. 21-ton benzine tank wagons, and 11 10,500-gal. 21-ton fuel oil tank wagons. The total contract price is £110,000 c.i.f. Sudan. These tank wagons represent the first shipment of any kind of rolling stock to be exported from Japan to the Sudan.

The London Transport Executive has placed a contract with Holland & Hannen and Cubitts (Gt. Britain) Limited, for the erection of a Central Laboratory at Chiswick Works. The value of the contract is some £140,000 and the work is due for completion at the end of June, 1960.

The London Transport Executive has placed a contract with Charles Booth & Son (Contractors) Ltd. for extensions to the offices of the Chief Mechanical Engineer (Railways), at Acton Works. The value of the contract is some £72,000 and the work will take 52 weeks.

British Railways, London Midland Region, has placed the following contracts:—

E. B. Jones & Rawlinson Limited: alterations to platform buildings at Gatley and Mauldeth Road Stations

Cubar Construction Co. Ltd.: new shed over turntable roads at Crewe North Motive Power Depot

North Thames Gas Board: renewal of gas mains at St. Pancras Chambers

Leonard Fairclough Limited: bridge and tunnel alterations between Queen's Drive and High Street on Birmingham Inner Ring Road

W. R. Payne & Sons Ltd.: cleaning and painting of roof, Liverpool Central Station

Arthur Scull & Son Ltd.: renewal of condense mains and branches at Willesden Carriage Washing Shed

Octavius Atkinson & Sons Ltd.:

structural steelwork at Cricklewood Light-weight Diesel Shed

General Asphalte Co. Ltd.: surfacing and drainage of coal bay stables at St. Pancras Goods Depot

E. B. Jones & Rawlinson Limited: remodelling of station buildings at Oxford Road Station, Manchester.

British Railways, North Eastern Region, has placed the following contracts:—

Handy Angle Limited: provision and erection of racking, Leeds, Neville Hill M.P.D.

Concrete Services Limited: pre-cast concrete units forming complete canopies for diesel fuelling columns.

Tarslag Limited: substructure work, Ryhope, Bridge No. 63A

W. S. Westin Limited: electrical installation, Huddersfield Goods Depot offices and yard.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follow:—

#### From Pakistan:

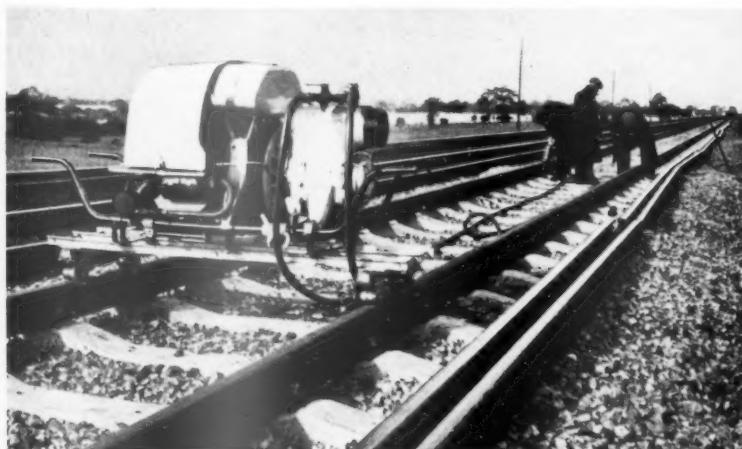
3 items of steel axles, straight inside journals

2 items of flanged steel tyres, stud fastening type

The Issuing Authority is the Chief Controller of Stores, North Western Railway, Empress Road, Lahore. The tender No. is 210-S/1-X(PIL). The closing date is May 14, 1959. Local representation is essential. A complete set of tender documents can be had from the Chief Controller of Stores, Empress Road, Lahore or the District Controller of Stores, N.W. Railway, Karachi Cantonment. A copy of the tender documents but not specifications or drawings, is available at the Branch for loan to United Kingdom firms in order of receipt of applications. The Board of Trade reference is ESB/10131/59.

Further details regarding the above tender, together with photo-copies of tender documents, can be obtained from the Branch (Lacock House, Theobalds Road, W.C.1).

## Fastening Rails to Concrete Sleepers



Hymek air compressor used with screwing tools during re-laying with A.D. concrete sleepers, near Tollerton, N.E. Region (see our March 27 issue)

## Notes and News

**Drumchapel Goods Station to be Closed.**—British Railways, Scottish Region, announces that from May 4, Drumchapel Goods Station will be closed. Alternative rail facilities are available at Clydebank West. Coal traffic will be dealt with at Knightswood mineral depot.

**Allen West & Co. Ltd.**—The final dividend of Allen West & Co. Ltd. is 7½ per cent payable on June 19 on increased capital. An interim of 5 per cent was paid last October prior to the issue. Group profits were £426,704 (£483,275) after tax of £347,456 (£567,186).

**Ambulance Coaches for Sick Pilgrims.**—British Railways, Southern Region, has converted a number of carriages as ambulance coaches to carry sick pilgrims on the journey to Lourdes. Each year the number of pilgrims from Great Britain increases, and several special trains are run for them.

**Pre-Fabricated Stations for the London Midland Region.**—British Railways, London Midland Region, has announced the successful development of a system of pre-fabrication for small and intermediate size stations. Tenders have been invited for the rebuilding of several stations on this system on the Manchester-Crewe electrified line.

**Lectures on Materials Handling Subjects.**—The National Joint Committee on Materials Handling, on which are represented professional and kindred societies concerned with the scientific approach to materials handling, is available to assist societies and other bodies drawing up their programmes for the 1959/60 sessions, by suggesting suitable subjects for lectures. Further information may be obtained from the Secretary, National Joint Committee on Materials Handling, 69, Cannon Street, London, E.C.4.

**N.E. Region Road Safety Campaign.**—A silver cup, given by the Company of Veteran Motorists to the North Eastern Region of British Railways in 1956, for annual competition between the districts of the Region in connection with the Safety on the Roads Campaign, has been won for the year 1958 (the second year in succession) by the Middlesbrough District Commercial Superintendent's district. At a ceremony in the York Headquarters Offices of the North Eastern Region, Mr. W. H. Vine, Commercial Officer, North Eastern Region, formally presented the cup to Mr. D. S. Lewis, District Commercial Superintendent, Middlesbrough.

**English Steel Corporation Exhibits at Lisbon Trade Fair.**—The products of the English Steel Corp. Ltd. (including Taylor Bros. & Co. Ltd., and the Darlington Forge Limited) and its associated company, Firth-Vickers Stainless Steels Limited, Sheffield, will be exhibited at the British Trade Fair, Lisbon, on May 29-June 14. All companies are represented locally by Monteiro Gomes Ltd., which recently passed to English Steel Spring Corp. Ltd., two replacement orders worth £24,100 for railway coil and laminated springs for delivery to Portuguese East Africa. Because of their size and weight, the larger sized products manufactured, which include heavy forgings and steel castings, will be portrayed photographically, as will the steel-making capacity. The exhibits on view, therefore, will only include smaller-size products such as railway coil and laminated springs, automatic couplers for railway rolling stock, high-grade carbon and alloy steels, engineers' cutting tools, permanent magnets and an exhibit by Taylor Bros. & Co. Ltd., of scale models of solid

forged railway wheels, tyres, and axles. An E.S.C. subsidiary, English Steel Castings Corp. Ltd., will be loaning for display on the British Iron & Steel Federation stand at the same Exhibition a "Commonwealth" type one-piece cast-steel bogie as supplied to the New Zealand Government Railways and exhibited previously at the Brussels World Fair, 1958, where it was awarded a Diploma of Honour by the Fair's International Juries in Class 20/3 (Steel and Iron Foundry Work).

**East African Railways Films at Harrogate Festival.**—East African Railways & Harbours entered four films for the recent Harrogate Festival of Films in Industry. One of these, "Opportunities for Employment," was selected for screening at the Festival. This film was made to help the recruiting campaigns, but in fact it has turned out to be one of the more effective films for publicising the work of the E.A.R. & H. in East Africa, as it emphasises the multi-racial aspect of the railways' activities.

**A.C.C. - Vickers - Babcock Limited.**—The formation of a new engineering company in India by Associated Cement Companies of India (A.C.C.), Vickers Limited, and Babcock & Wilcox Limited, called A.C.C.-Vickers-Babcock Limited, has received encouragement from and the full support of the Government of India. The registered office is at Bombay. A large works is to be built by the new company at Durgapur in West Bengal, to manufacture heavy engineering products. It is expected that actual production will begin in 1962.

**Crewe Dinner.**—The 52nd annual dinner of the Crewe Pupils & Apprentices' Association was held at the Royal Automobile Club, London, on April 24. Some 45 members and their guests were present. The toast "Past and Present Crewe Men" was proposed by Mr. A. E. Robson, Chief Mechanical & Electrical Engineer, London Midland

Region, British Railways. Mr. R. C. S. Low, Acting Works Manager, Horwich Locomotive Works, replied on behalf of past Crewe men; and Mr. P. Baker for present Crewe men. The toast of the guests was proposed by the Chairman, Colonel Kenneth Cantlie; and a response was made by Mr. R. Arbuthnott, President of the Institution of Locomotive Engineers. After the dinner two films were shown: "General Repair"—a B.T.C. film about Crewe Works; and an extract from a news reel, showing the last steam locomotive leaving the works.

**British Railways Amateur Boxing Finals.**—The Inter-Regional finals of the British Railways Amateur Boxing Championships, in which over 200 railwaymen from all parts of Britain took part, were held at the Royal Albert Hall, London, on April 30. The prizes and trophies were presented by Sir Brian Robertson, Chairman of the British Transport Commission.

**D.S.I.R. at the Corrosion Exhibition.**—The National Chemical Laboratory, Department of Scientific & Industrial Research, will feature the work of its Corrosion of Metals Group, at the Corrosion Exhibition, The Horticultural Hall, Westminster, S.W.1, on April 27-30. Methods of gaining knowledge of corrosion processes and of preventive measures, and assistance given to industry are to be illustrated by examples of research in progress at the laboratory.

**Glasgow Suburban Electrification.**—Continuation of construction work in connection with the Glasgow suburban electrification scheme will take place during the period from April 27 to May 1 inclusive, between Singer and Dalmuir Park, between Jordanhill and Dalmuir Park, and between Dalmoch and Balloch. Morning and evening peak train services will not be affected. There may be slight delays to forenoon and afternoon trains on the Glasgow-Helensburgh-Balloch line.

### Diesel Locomotive Ride for Schoolboys



Sir Brian Robertson, Chairman of the British Transport Commission, invited boys of St. Marylebone Grammar School to ride in the cab of British Railways Type "4" diesel-electric locomotive "Seafell Pike" at the demonstration at Marylebone Station last week

**B.T.H. Limited at Transistor Exhibition.**—The International Transistor Exhibition at Earls Court, London, on May 21-27, will include a display by the British Thomson-Houston Co. Ltd., of low and medium power semiconductor devices, manufactured at Lincoln. Examples are high and low frequency transistors for amplification and switching applications in railway automation; germanium point-contact diodes for computers, and data processing; germanium and silicon junction rectifiers for a variety of rectification purposes in small instruments and general applications; and silicon microwave diodes for radar. In the semiconductor power rectifier field, the Associated Electrical Industries Heavy Plant Division managed by B.T.H. will show cell-and-fin assemblies and typical power rectifier stacks.

**Babcock & Wilcox Limited.**—Group profits of Babcock & Wilcox Limited for 1958 were £3,277,626, a fall of £1,312,364 compared with the previous year. A final ordinary dividend of 7 per cent. is being paid, making 13 per cent.

**Morgan Crucible Co. Ltd.**—Recent increases in the demand for Sinterlink, sintered-metal clutch-facing material made by The Morgan Crucible Co. Ltd., have led to a move to larger premises. The Sales Office has been moved to Wandsworth Works, Point Pleasant, Wandsworth, London, S.W.18, and a new factory and laboratory, established there for the production and development of Sinterlink. This combines plant and facilities previously situated at Battersea, and Norton, Worcester.

**Goods Traffic at Bankfoot.**—British Railways, Scottish Region, announces that, with the approval of the Transport Users' Consultative Committee for Scotland, Bankfoot Goods Station, Perthshire, becomes an unstaffed public siding for traffic in full wagonloads only (including livestock), from May to September each year. During this period all traffic is being dealt with by the stationmaster at Luncarty. From October to April inclusive Bankfoot will be staffed as at present. Arrangements for the collection and delivery of parcels and freight traffic in less than wagonloads in this area continue as before.

**Repair Work to Cononish Viaduct, Scottish Region.**—British Railways, Scottish Region, is carrying out repairs to Cononish Viaduct, a four-span masonry arch structure situated between Crianlarich Lower and Tyndrum Lower carrying the single line Callander & Oban Branch over the River Cononish. The two end spans are dry while the two larger middle spans bridge the river. Severe scour had caused bad undercutting below the centre pier whilst the earth banking in front of another pier had been swept away and exposed a poor quality masonry forming the pier. The repairs involve the construction of a concrete buttress to protect the exposed pier and the underpinning of the centre pier.

**Offer for New York City Transit System.**—Mr. Roy Chalk, a British-born financier who is head of the public transport system in Washington, D.C., and of Trans-Caribbean Airways, is reported to have made his first definite offer for the New York City Transit System, in a letter to the Mayor, Mr. Wagner, saying he was prepared to pay \$615 million (£220 million) as the purchase price. The New York transport system has been valued at more than \$715 million.

**D.S.I.R. National Engineering Laboratory.**—The Mechanical Engineering Research Laboratory at East Kilbride, near Glasgow, has been renamed The National Engineering Laboratory to emphasise the national charac-

ter of the laboratory which is part of the Department of Scientific & Industrial Research organisation and is financed from public funds. The laboratory will continue to be concerned with problems of mechanical engineering. Also it has been decided to set up a Steering Committee to look after the programme of the laboratory under the chairmanship of Vice-Admiral Sir Frank Mason, who is a member of the Research Council and chairman of the outgoing Mechanical Engineering Research Board.

**Charing Cross and Strand Underground Station Names Unchanged.**—London Transport Executive has told Westminster Council that although the names of the Strand and Charing Cross Underground stations are not ideal, it is best to keep them as they are. The council had suggested that the names were misleading in relation to the Charing Cross main-line station of British Railways, Southern Region.

**New London Transport Garage at Stevenage.**—London Transport's new garage at Stevenage, facing the New Town Centre in Dane Street, provides for a covered parking area flanked by workshops and stores, with administrative offices and a public enquiry office housed in a separate single-storey building, 145 ft. long. A covered floor area of 185 ft. x 98 ft. gives unobstructed accommodation for 49 buses. Equipment of standard design provides for automatic refuelling, lubricating, and vacuum cleaning. There is a compressed-air ring main, an Essex bus-washing machine, and an Eco roof washer. The diesel-oil fuelling points are fed from three 5,000 gall. overground tanks.

**Beldam Asbestos Co. Ltd. Works Extension.**—An official opening ceremony of the Lascars Works extension of the Beldam Asbestos Co. Ltd., at Hounslow, Middlesex, was performed by the Minister of Transport & Civil Aviation, Mr. Harold Watkinson, on April 27. In welcoming the Minister, the Chairman of the company, Mr. Robert Beldam, said that the company had been closely connected with all forms of transport since its foundation. The building, with a total floor area of approximately 100,000 sq. ft., has four floors; a machine shop and exhibition room on the ground floor. On the second floor is office accommodation and the stationery department. Above are chemical and rubber laboratories and the research and development departments. On the top floor are the group's administrative offices. The opening ceremony marked the 70th anniversary of the company.

**New Headboard for "Master Cutler."**—When the former L.N.E.R. inaugurated the original "Master Cutler" train in 1947, between Sheffield and Marylebone, the then Master of the Company of Cutlers in Hallamshire, the Hon. R. A. Balfour (now Lord Riverdale) presented a stainless-steel headboard made by Firth-Vickers Stainless Steels Limited. From September, 1958, the train has been run as a diesel-hauled all-Pullman express from Sheffield Victoria to King's Cross via Retford. It was given its first send-off by Sir Frederick Pickworth, Master Cutler at the time, and Chairman of English Steel Corporation Ltd., which holds a 50 per cent interest in Firth-Vickers; Thos. Firth & John Brown Limited holds the other 50 per cent. Sir Frederick Pickworth is a past Chairman of Firth-Vickers. On April 21, at Staybrite Works, Sheffield, the head offices of Firth-Vickers Stainless Steels Limited, Mr. W. D. Pugh, Chairman of the company, presented to the Master Cutler, Mr. J. Hugh Neill, a new headboard, cast

in Staybrite stainless steel. It includes the coat of arms of the city of Sheffield and the Company of Cutlers in Hallamshire. Mr. G. F. Fiennes, Line Traffic Manager (Great Northern) Eastern Region, received the headboard on behalf of British Railways, and returned to the Master Cutler the original stainless steel headboard used on the locomotives which hauled the train between Sheffield and Marylebone.

**Anti-Attrition Metal Limited.**—The group loss on trading in 1958 of Anti-Attrition Metal Limited, a subsidiary of Beyer Peacock & Co. Ltd., was £22,454 (£484 profit). The amount carried forward is £30,128 (£44,004). Trading for the current year so far points to improved profitability. The subsidiary companies did well in 1958, and their outlook is reasonable.

**G. D. Peters & Co. Ltd. Results.**—The net profit of G. D. Peters & Co. Ltd., engineers and railway rolling stock manufacturers, in 1958, amounted to £101,698 (£124,988). The dividend is 10 per cent. The turnover for the year was greater than in 1957, but increased competition necessitated keen prices with resultant lower margins. Re-equipment is going according to plan with beneficial effect on the company's competitive ability and order book.

**Code of Practice for Power Transformers.**—A British Standard publication, C.P.1010: 1959, guide to the loading of transformers to B.S.171, contains 31 pages of guidance on the loading of oil immersed transformers to B.S.171 (Power transformers) with Class A insulation, and is based on their thermal characteristics and fittings. The 1927 and 1936 editions of B.S.171 contained certain recommendations on the loading of transformers. C.P.1010 supersedes those recommendations. It sets out a list of basic data which include, as a basis for the recommendations, four categories of daily operating conditions associated with the permissible maximum temperature of the windings. The information is given in a series of tables and their use is illustrated by examples. One of the examples shows how a user with a transformer in service can permit the transformer

to carry a load above its rated k.V.A. without reducing its potential life. Copies, price 7s. 6d. may be obtained from the British Standards Institution, 2, Park Street, London, W.1.

**Brown Bayley Steels Limited.**—Mr. J. W. Garton, the Chairman of the Brown Bayley Group believes that it is extremely unlikely that profits of Brown Bayley Steels Limited will be maintained in the current year. He states that during the first few months there has been a slight increase in the order intake.

**Exhibition Coach Displays Scottish Sports Goods.**—A British Railways Scottish Region exhibition coach is touring England to display Scottish-made sports goods to the trade. The coach already has been to stations at Preston, Liverpool, Manchester, Wolverhampton and Birmingham. It is now at Coventry where it will remain until May 2.

**British Railways L.M.R. (London) Amateur Musical Society.**—"Pink Champagne," a new adaptation of "Die Fledermaus," is being produced by British Railways London Midland Region (London) Amateur Musical Society at the Scala Theatre, London, on May 8 and 9. The cast of singers and dancers is composed of railway staff and includes Cyril Howcroft, a goods guard, who plays the principal role.

**Increased Orders for Steel.**—Orders for many types of steel product are beginning to increase and the industry has become slightly more optimistic than it was a few months ago. The running down of stocks, one of the main reasons for the industry's decline in the past year, seems to have come to an end. Even consumers who are as badly hit by the reduced demand for their products as they were in the middle of last year are now taking delivery of bigger tonnages of steel.

**British Owned Mining Railway Requisitioned by Mexican Government.**—The Mexican Government is reported to have requisitioned a partly British-owned mining railway between Saltillo and Zacatacas in Central Mexico. The 100-mile railway was owned primarily by Mazapil Copper Limited, but it is understood that some 60 per cent of the



New stainless-steel headboard attached to English Electric diesel locomotive working the "Master Cutler" between King's Cross and Sheffield

shares are in Britain, and a large part of the remainder in the United States. The requisitioning order was issued when the company closed the line after permission to raise rates had been refused. It is reported that the Mexican Government expects to begin talks on compensation soon.

**British Transport Advertising Sites at Notting Hill Gate Station.**—A feature of the new Underground station at Notting Hill Gate are the British Transport Advertising sites designed to achieve maximum impact on the 20,000 passengers who use the station every week. The effect has been achieved by use of aluminium, plastics, strip lighting, and tiles of many colours. Emphasis has been placed on providing advertisers with numerous solus and special sites in the ticket hall and station concourses. The station was described in our March 6 issue.

**North Eastern Region Ambulance Competition.**—The final of the 1959 British Railways, North Eastern Region, Ambulance Competition was held in the Railway Institute and Gymnasium, York, last Wednesday. Ten teams took part, and Mr. H. A. Short, General Manager, British Railways, North Eastern Region, who is President of the North Eastern Region Ambulance Centre presided. Mrs. Short presented the Lloyd Wharton Shield to the winners and the Thomas Hornsby Cup to the runners-up. The winners and runners-up will represent the North Eastern Region in the Inter-Regional Competition which is to be held in the Central Hall, Westminster, London, on June 5.

**Derwent Valley Light Railway.**—The accounts for the year ended December 31, 1958, of the Derwent Valley Light Railway Co. Ltd., show that the total tonnage of minerals and merchandise carried was 31,050 tons, a decrease of 1,308 tons, against the 1957 figures, but coal and coke increased by 1,255 tons, making the total tonnage carried practically the same as the previous year, namely, 57,552 tons, against 57,605 tons in 1957. In 1958, there was a large increase in timber traffic. Gross receipts were £24,212, almost identical with the previous year, and expenditure £21,731, against £21,886 in 1957. The directors recommend dividends of 5 per cent on the preference, and 5 per cent on the ordinary shares. £1,000 is to be placed to general reserve.

## Forthcoming Meetings

May 4 (Mon.).—The Society of Engineers, in the apartments of the Geological Society, Burlington House, London, W.1, at 5.30 p.m. Paper on "Grouting and civil engineering," by Mr. D. J. Ayres.

May 6 (Wed.).—Electric Railway Society, at Fred Tallant Hall, 153, Drummond Street, London, N.W.1, at 7.15 p.m. Paper on "It's safer by rail," by Mr. P. Hale.

May 6 (Wed.) to May 8 (Fri.).—The Institute of Materials Handling, first international conference at the Waldorf Hotel, London, W.C.2. Conference to be opened by Sir Edward Beddington-Behrens.

May 9 (Sat.).—Permanent Way Institution, Leeds & Bradford Section. Visit to long welded rail plant at Dinsdale.

May 9 (Sat.).—Permanent Way Institution, London Section. Visit to Britannia Tubular Bridge, Menai Straits, London Midland Region, British Railways. Joint visit with North Wales Section.

May 16 (Sat.).—Railway Correspondence & Travel Society, Sussex & Kent Branch, at the Railway Hotel, Brighton, at 6.30 p.m. Paper on "Douglas Drummond, the man and his work," by Mr. T. Clyde Britten.

## Railway Stock Market

Steady buying of industrial shares persisted in stock markets, encouraged by financial results showing a number of higher dividends. In fact, there are signs that the Budget Tax cuts, particularly the reduction in the standard rate of income tax, are leading to a more liberal dividend policy by some companies. British Funds have been inclined to strengthen, though the prevailing City view is that an early reduction in bank rate to 3½ per cent now seems unlikely. The more active conditions in markets have probably resulted from the belief that the general election will not take place until next October at the earliest.

Movements among foreign rails were again small and without much significance. Antofagasta ordinary stock improved from 12½ to 13½, though the preference stock at 25½ was fractionally easier on balance. The 4 per cent perpetual debentures strengthened from 35½ to 36, and the 5 per cent (Bolivia) debentures remained at 85½. Costa Rica ordinary stock eased from 13½ to 13, but Chilean Northern 5 per cent first debentures improved from 55 to 55½.

Mexican Central "A" bearer debentures kept at 59. International of Central America common shares remained at \$23, while the preferred stock improved from \$108 to \$110. San Paulo Railway 3s. units were again 1s. 10½d., Brazil Railway bonds eased from 6 to 5½, while United of Havana second income stock was maintained at 6. Paraguay Central prior debentures were again quoted at 6, while Guayaquil & Quito assented bonds were marked up two points from 78 to 80½.

Canadian Pacifics have eased to \$53½, which compares with \$54½ a week ago; the 4 per cent preference stock was 54½ and the 4 per cent debentures 65½. Nyasaland Railways shares remained at 13s. 9d., West of India Portuguese capital stock has changed hands at 106. White Pass shares came back to 13½.

A feature among shares of locomotive builders and engineers has been a rally in Birmingham Wagon to 20s. 3d. which compares with 18s. 9d. a week ago. North British Locomotive at 9s. 3d. compared with 9s. 6d. a week ago, while Beyer Peacock 5s. shares were again 7s. 7½d., and Charles Roberts 5s. shares at 11s. 7½d. more than held their recent rise.

C. D. Peters remained as firmly held as ever and were again quoted at 26s. 10½d. Wagon Repairs 5s. shares firmed up from 8s. 6d. to 8s. 9d., and Gloucester Wagon 10s. shares remained at 17s. 10½d. Westinghouse Brake at 43s. 9d. were within 3d. of the price a week ago. Recent sharp gains in bearing shares induced a little profit taking, Ransomes & Marles 5s. shares easing from 18s. 6d. to 18s. and Pollard Bearing & Electrical Engineer, London Midland 4s. shares from 26s. 6d. to 26s. British Timken were quoted at 81s. compared with 82s. 6d. a week ago.

Buyers were again in evidence for B.I. Cables on further consideration of the results, and these shares have risen afresh from 52s. 9d. to 54s. The 10s. shares of

Dowty Group again changed hands around 41s. and Pressed Steel 5s. shares firmed up from 25s. 10½d. to 26s. 1½d. A good feature has been a further advance from 49s. 3d. to 52s. 9d. in Stone-Platt Industries. Associated Electrical were also prominent, having risen on balance from 59s. 6d. to 60s. 9d. English Electric have been steady at 63s. 9d., General Electric were 32s. and Crompton Parkinson 5s. shares slightly higher on balance at 14s. 3d. Vickers improved afresh to 34s. 4½d. Enfield Cables were 19s. 6d. and Enfield Rolling Mills 46s. 3d. while Guest Keen rose sharply to 59s. 1½d. Renold Chain were 45s. 4½d. Tube Investments 83s. 3d. and T. W. Ward 87s. 9d. Edgar Allen shares have changed hands around 32s. 3d.

## OFFICIAL NOTICES

**REQUIRED** for the Central Railway of Peru—Assistant Accountant. Age 30-40 years. Qualifications required: knowledge of railway accounting in South American and Spanish. Salary £1,500/£1,750 per annum according to qualifications. Apply in writing to: Peruvian Transport Purchasing Company Limited, Suffolk House, 5 Laurence Pountney Hill, Cannon Street, London, E.C.4.

**RAILWAY TURNTABLE.** For sale, Mundt type standard gauge turntable, 65 ft. long, carrying capacity 150 tons approx. **WATER CRANE.** 3,000 gallon Water Crane. **TURNOUTS.** Twenty 1 in. Turnouts in 75 lb. F.B. rail; interchangeable to suit L.H. or R.H. All these items are in excellent condition. Apply Eagle Construction Co. Ltd., East Common Lane, Scunthorpe, Lincs. 'Phone: 4513.

**THE RAILWAY TIMES** 5 bound volumes 1841-1845. What offers? Write Box 191, Grantham, Advertising, Reading.

### CORAS IOMPAIR EIREANN

**CORAS IOMPAIR EIREANN** invite application for the post of Manager of Road Freight Service. This Officer will be responsible to the Traffic Manager for the control of:—

1. Railhead, Freight and Parcels Services to work in co-ordination with the Board's Railway Services.
2. Direct Road Transport Services for general merchandise, livestock and specialised services including heavy haulage and furniture removals.

Applicants should have experience of modern road transport operating techniques and commercial practices.

The post involves control of about 1,300 Traffic Staff and 700 vehicles.

Applications should be submitted not later than May 8, 1959, to:—

Secretary, Coras Iompair Eireann, Kingsbridge Station, Dublin.

Cavassing will disqualify.

M. J. HAYES, Secretary.

Kingsbridge Station, Dublin.  
April, 1959.

### GHANA PUBLIC SERVICE COMMISSION

**ENGINEERS** with recognised qualifications B.Sc.(Eng.) plus 2 years post-qualification practical experience or requisite qualification for associate membership of the appropriate Engineering Institutions—are required for the following appointments:

#### GHANA RAILWAY

**DIESEL ELECTRIC ENGINEER** to be responsible for the running and workshop maintenance and repair to diesel-electric engines.

**CIVIL ENGINEERS** to be responsible for the maintenance of the track, bridges, buildings and other engineering works on a section of the railway.

**TERMS OF SERVICE.** Both appointments will be on contract/gratuity terms of three years each of 15-18 months. Contract salary in the range £1,080-£2,080 p.a. (consolidated) according to age, qualifications and experience. Gratuity at rate of £12 10s. for each completed month of service. Secondment or pensionable terms may be arranged. Free first class passage for officer, wife and up to three children under 18 years and in addition an education allowance for children when not resident in Ghana of £100 a child for up to 3 children under 18 years. Accommodation at low rental. Interest-free advance for car, and car maintenance allowance. Generous home leave on full pay. Income tax at low local rates.

For further particulars and application form write, stating age, qualifications and experience to THE DIRECTOR OF RECRUITMENT, GHANA HIGH COMMISSIONER'S OFFICE, 13, BELGRAVE SQUARE, LONDON, S.W.1.

